THE MARINE REVIEW

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COMMERCE OF THE GREAT LAKES.

The department of commerce and labor has issued a statement of the traffic of the Detroit river during 1905. It is unfortunate that the figures cannot be regarded as absolutely accurate owing to the imperfect system of gathering them—that is to say there is no congressional enactment or specific appropriation for compiling the statistics and the work is therefore, not done with the same thoroughness that mandatory work is performed. Fortunately, however, there is an accurate gauge of a considerable portion of Detroit river commerce and that is the commerce which passes through Sault Ste. Marie canals. This is measured to the pound and is but a part of the commerce of Detroit river. The total commerce of Detroit river is given by the department of commerce and labor as 53,639,086 tons tabulated as follows:

Months.	South. Net tons.	North. Net tons.	Total. Net tons.
April	1,575,877	792,711	2,368,588
May	4,551,972	1,352,524	5,904,496
June	5,523,021	1,780,541	7,303,562
July	5,911,625	1,941,534	7,853,159
August	6,300,003	2,314,810	8,614,813
September	4,597,640	1,493,059	6,090,699
October	5,582,689	1,522,905	7,105,594
November	4,593,752	1,578,375	6,172,127
December	1,354,506	871,542	2,226,048
Total	39,991,085	13,648,001	53,639,086

The southbound movement will be seen to be nearly three times as great as that in the opposite direction. This is largely due to the enormous eastbound tonnage of iron ore from upper lake ports to ports along the southern shore of Lake Erie, notably Cleveland, Fairport, Ashtabula, Erie and Buffalo, whence it is largely shipped by rail to the great iron and steel districts of southwestern Pennsylvania. Were it not for this enormous traffic the through westbound shipments of coal, largely from the same Lake Erie ports, would make the total northbound freight movements through the Detroit river far in excess of those southbound.

Of the freight carried in a southerly direction through this river during the past season of lake navigation, 1,090,997 tons were flour; 3,176,928 tons grain and flaxseed; 32,900,685 tons ore and minerals (exclusive of coal, of which there was no southbound movement); 1,851,324 tons lumber, and 971,151 tons unclassified freight.

Of the northbound movement, 11,928,158 tons were coal; 6,178 tons grain and flaxseed; 415,533 tons ore and minerals; 11,940 tons, lumber, and 1,286,192 tons, unclassified freight.

During the lake season of 1905 the difference between the amount of freight carried, respectively, through the Detroit river and the Sault canals amounted to 9,368,406 tons in favor of the former route, and this total may be said to represent, with at least a fair degree of accuracy, the traffic through the straits of Mackinac, as what might be termed the local trade between Lake Superior or Lake Huron and Lake Michigan is comparatively small. The traffic through the Straits of Mackinac consists largely of shipments of grain and flour from Chicago and iron ore from Escanaba, while the westbound cargoes consist largely of coal and package freight.

The freight traffic through the canals at Sault Ste. Marie and Ontario during the past ten years has been as follows:

Season.	South. Net tons.	North. Net tons.	Total. Net tons.
1896	.....	.....	16,239,061
1897	.....	.....	18,982,755
1898	.....	.....	21,234,664
1899	20,619,534	4,636,276	25,255,810
1900	20,532,493	5,110,580	25,643,075
1901	23,087,742	5,315,323	28,403,065
1902	30,275,989	5,685,157	35,961,146
1903	26,932,238	7,742,199	34,674,437
1904	24,213,902	7,332,204	31,546,106
1905	36,778,738	7,491,942	44,270,680

During 1905 the total freight movement through the United States canal at Sault Ste. Marie amounted to 38,802,190 tons while that through the Canadian canal totaled 5,468,490 tons.

In the following table, which presents the volume of water-borne traffic between Lake Erie and Lake Ontario, by way of the Welland canal, built by the Canadian government, and which runs parallel with the Niagara river, figures representing freight movements for the canal seasons of 1904 and 1905 are not available.

Season.	Down. Tons.	Up. Tons.	Total. Tons.
1894	745,942	243,592	989,534
1895	621,926	230,100	852,026
1896	957,928	285,667	1,243,595
1897	1,026,458	218,292	1,244,750
1898	902,519	218,211	1,120,730
1899	622,104	157,514	769,618
1900	579,312	109,245	688,557
1901	501,935	89,301	591,236
1902	567,286	78,811	646,097
1903	715,595	263,212	979,807

NO BLAME PLACED.

An interim report has just been presented to the Dominion Government, at Victoria, B. C., through Senator William Templeton, by the Canadian Commissioners investigating the steamer Valencia disaster, declaring the available evidence insufficient to justify a positive conclusion as to whether or not the calamity was chargeable to the inadequate lighting of Vancouver Island and coast. Basing their views upon expert testimony, the commissioners, Capts. Gandin and Newcoimbe, of the government service, and Cox, Lloyds British Columbia agent, urge the immediate establishment of a number of important aids to navigation along the western and southern seaboard of Vancouver Island.

Wm. Woodhouse, proprietor of the Woodhouse Chain Works, Trenton, N. J., died on Wednesday, Feb. 28.

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LIVERPOOL SHIPPING LETTER.

Liverpool, March 5.—The Liverpool Underwriters' Association have issued a classified return of casualties to vessels of 500 tons gross register and upward which have been posted in the Loss Book during the month ended Feb. 28 last. They number 430, as against 433 in the corresponding month of last year, 508 in February, 1904, and 560 in February, 1903. The number and gross tonnage of vessels totally lost in February, 1905, were as follows: British, 4 sail of 7,500 tons, and 3 steam of 5,091 tons; foreign, 3 sail of 3,961, and 5 steam of 10,188 tons; total, 15 ships of 26,740 tons; as compared with 22 ships, and 44,918 tons in February, 1905; and 20 vessels of 29,517 tons in February, 1904. The total estimated loss occasioned by these casualties is $825,000 in steam tonnage, and in sail $500,000. The nature of casualty is given as follows: Weather damage, 81; founderings and abandonments, 1; strandings, 121; collisions, 134; fires and explosions, 19; missing, 3; damage to machinery, shafts and propellers, 61; other casualties, 10; total 430. The 15 vessels totally lost are recorded as being due to strandings, 8; collisions, 2; missing, 3; fires, 1 and founderings, 1.

The British colonial office has just issued the report adopted unanimously by a conference of delegates representing the governments of Portuguese East Africa, the Cape Colony, Natal, the Transvaal Colony, the Orange River Colony, and Rhodesia, appointed to meet in London to give effect to the recommendations of previous conferences which dealt with the question of ocean freights to South African ports. At their first meeting, the conference invited the combined steamship companies to send reports to the conference, and the invitation was accepted. Prolonged discussion and negotiations followed, but they proved abortive, owing, as the report contends to the unreasonable attitude maintained by the shipping companies, this fact being recorded in the following resolution, passed at the last meeting of the conference. "That the shipping freights conference is of the opinion that no good purpose is to be served by the prolongation of negotiations with the ship owners, since every effort on the part of the conference to arrive at an agreement upon a reasonable basis has been met by wholly inadequate concessions. It is, therefore, resolved that the negotiations be closed, and that the ship owners be advised accordingly." In the concluding paragraph of the report, it is urged that prompt measures should be taken to remove or mitigate the present disability in trade produced by the high rates of freight, maintained by what is virtually a monopoly in ocean transport between Great Britain and her South African colonies.

The industrial revival in Britain is further evidenced by the favorable reports issued by Messrs Vickers Sons & Maxim, the big iron and steel manufacturers, who can produce everything from a ninepenny nail to an ironclad; and Messrs. William Doxford & Sons, ship builders, engineers, etc. Vickers, Maxim declare a dividend at the rate of 10 per cent, making 15 per cent for the year, against 12½ per cent for 1905, while the carry forward is raised $955,000 to $1,050,000. The company has orders on hand which will keep its works full for many months to come. William Doxford's profits show an extraordinary rise from £223,500 to £441,500, and the ordinary shareholders receive 20 per cent for the year, as against 12½ per cent twelve months ago, after placing £150,000 to reserve, and carrying forward £10,000. The net value of orders in course of execution on Dec. 31 last, was over £400,000. This company's output of shipping tonnage for 1905 was greater than that of any other firm in the united kingdom. Trade reports from the north of Britain continue to indicate widespread prosperity in the iron, steel and kindred industries.

Sir William H. White, K. C. B., late director of British naval construction, delivered the last of the series of five cantor lectures on modern warships on Feb. 27, the lecturer dealing principally with the development of the cruiser. The Blake and the Blenheim, built in 1888 were, he said, the predecessors of a large number of protected cruisers of large size, high speed, and great coal endurance. The defense of the vitals in these vessels primarily consisted of a strong steel protective deck but it was reinforced by special arrangements of the coal bunkers. The bunkers near the sides were intended to be kept full as long as possible, and the vessels were endowed with stability that enabled them to retain coal in the upper bunkers as long as might be thought desirable. When melinite lyddite and other high explosives were introduced, it was considered advisable in some navies to protect the broadsides of cruisers with thin steel armor, in order that the explosion of shells carrying powerful bursting charges might be made to take place outside the ship. The Depuy de Lome, built for the French navy about the time when the Blake and the Blenheim were built for the British navy, illustrated this system, the broadside throughout the length being covered with thin steel armor. Experience showed, however, that with thin side armor such as was necessarily adopted in large cruisers because of limitations of weight, it was possible to do enormous damage by using cheap chilled cast iron projectiles. Consequently, the decision of the admiralty was against adoption of the French practice, and in favor of the continuance of the protective deck system in association with armor protection for the armament in the shape of casemates, shields, etc. In Italy, about this time, financial limitations practically compelled suspension of the construction of large and costly battleships; and it was decided to build vessels instead which though classed as cruisers and of moderate size and cost should be capable of fighting in the line of battle. In this way the Italians came to be pioneers in the construction of the modern type of armored cruiser. Not until 1896, however, when the Cressy class was projected did Britain deem it wise to move in the same direction. Following Cressys came the four Drakes; and succeeding them, in order to checkmate the foreign movement which had for its object the destruction of Britain's commerce, the ships of the County class. The Duke of Edinburgh class followed, and in their wake came the Minotaurs to be followed in time by the Invincibles. There was a tendency, Sir William proceeded to say, in some navies to abolish the distinction between battleships and armored cruisers. In France, the idea was advocated by Admiral Fournier many years ago, and it had been revived recently by M. Bos, the reporter on the navy estimates for 1906. As yet, however, it had found no favor with the British admiralty, whose latest program included the Dreadnought type of battleship, and the Invincible class of cruiser. Of the eight scouts which have been lately built for the British navy, Sir William expressed the opinion that in relation to their size and cost they had very small offensive power. It was explained, of course, that they were to find safety in flight from more powerfully armored vessels. They were to be, so to speak, the eyes of the fleet. To do that sort of work it was obvious that their coal endurance would require to compare well with the coal endurance of the ships of the fleet. And it certainly did not. As a matter of fact, trials made by the vessels showed conclusively that their coal endurance at the cruising speeds was very much less than that of the battleships for which they were to scout, so that quite clearly their design did not fulfil the fundamental condition of effective scouting. In the United States, where three vessels intended for similar service were now under construction, very much larger coal supplies had been provided. The vessels had been increased in length and dis-

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placement, and very much more likely to prove of valuable service. To his mind, however, where such a large expenditure was necessary to attain high speed, it was questionable whether the acceptance of such small offensive power was justifiable. For much the same consideration of cost Sir William said he doubted the wisdom of building ocean-going destroyers of 36 knots. Recalling the difficulties that had been experienced in attempting to obtain 32 to 35 knots about 10 years ago, and having regard to the very great increase in power and cost inevitable with such a speed as 36 knots as well as the impossibility of utilizing the full power under conditions frequently occurring at sea, he thought it would be wise of the admiralty to obtain extended experience before committing themselves to its multiplication. He frankly admitted that he did not know where the expenditure on naval armaments was to end. At the time of Trafalgar the capital value of the British navy was $50,000,000. When he went to the admiralty it was $165,000,000 and when he left it was $500,000,000. He thought, however, that with power concentrated to such an extent that some single ships were costing nearly $10,000,000, it was time the naval authorities considered whether dispersion of both money and power into a larger number of ships was not a wiser alternative.

Sir Charles Palmer M. P., speaking at the annual dinner of the Newcastle and Gateshead Chamber of Commerce the other day, remarked that as an old director of the Suez Canal Co., he believed it was too important a trade channel to remain in the condition it was. The sinking of a single vessel could block the passage as had occurred recently. What was wanted was a large waterway and reduced dues. The latter matter was being taken up by the great shipping interests of Liverpool and London. In Liverpool, they were proposing that, as the British government received enormous dividends upon its investments, a large proportion of that amount should go in the reduction of the dues. He would not deal with that view, but would merely remark that if they wanted to extend their trade and commerce, it could only be done by cheap distribution of products.

In common with other firms engaged in the North American trade, the three Glasgow companies—the Anchor, Allan and Donaldson lines,—are participating in the emigration boom. Indeed, the demand for berths is quite phenomenal, considering the earliness of the season. A feature of the traffic is the large number of emigrants who, despite the fact that their ultimate destination is Canada, are proceeding via New York. Special railway facilities have been granted, and an arrangement has been completed by obviating a second examination of baggage by the customs authorities. It is only at the Canadian frontier that it comes under the notice of the customs. Large numbers of foreigners, mostly Russian Jews, Poles and Scandinavians, continue to book by the Glasgow lines.

One thought that a restaurant, a flower stall, a telephone system, and an elevator were enough splendor to introduce in an ocean liner. The Amerika, which was built last year by Harland & Wolff for the Hamburg-American line, contained these. But (writes a London correspondent) in the Nieuw Amsterdam, which has just been delivered at Rotterdam to the Holland-American line, there is another. It is a tea room in the Japanese style, the panels are of polished satinwood with lacquers and inlay specially procured in Japan, on parts of the walls are landscapes in Dutch tiles, and from painted linen pictures in the ceiling hang very delicately colored Japanese lanterns. Daylight reaches the room chiefly through a stained glass dome adorned with blue laburnums and figures of birds. The furniture is, of course, bamboo and characteristically Japanese.

THE MERCHANT MARINE BILL.

SENATOR GALLINGER IN AMERICAN INDUSTRIES.

"Delivery wagon" ships are what are provided for in the bill of the Merchant Marine Commission which has just passed the national senate by a decisive majority and goes to the house of representatives. No swift and luxurious ocean greyhounds, no "floating palaces," are to be created by this moderate business-like measure which follows closely the urgent recommendations of the late President McKinley and of President Roosevelt, and is fortunate enough to have the hearty approval of bodies representing the great industrial interests of the United States.

Not a dollar of expenditure is authorized by this bill on new, fast passenger lines to Europe. In this respect the bill is radically unlike any other shipping legislation ever presented to congress. This was one of the first points which had to be determined by the senators and representatives of the Merchant Marine Commission, and after due thought it was unanimously resolved to throw the whole weight of the proposed measure toward the creation of new shipping facilities to the half-developed markets of the West Indies, Central and South America, Africa and the Orient. At one time a proposition was accepted to add $250,000 to the mail compensation of the one American trans-Atlantic line from New York to Southampton, but this was subsequently withdrawn. The only increased compensation to an existing contract mail line provided for in the entire bill as it passed the senate is to the new line to Australasia, which is both the best line and the most poorly paid plying in South Pacific waters, and must inevitably succumb unless adequate aid is speedily forthcoming.

With this solitary exception the mail subventions contained in the bill all go to routes where there is now no regular and efficient American steamship service. Indeed, not so much as one American steamer is running at the present time on any of the new mail routes proposed in the Atlantic and the Gulf of Mexico. These new routes are:

An Atlantic port to Brazil.
An Atlantic port to Argentina.
An Atlantic port to South Africa.
A South Atlantic port to Cuba.
A Gulf port to Cuba.
A Gulf port to Brazil.
A Gulf port to Isthmus of Panama.
A Gulf port to Isthmus of Panama.
A Gulf port to Mexico.
A Pacific port via Hawaii to Japan, China and the Philippines.
A North Pacific port direct to Japan, China and the Philippines.
A Pacific port to Mexico, Central America and the Isthmus of Panama.

The added compensation of $217,000 to the existing line from San Francisco to Auckland and Sydney seems to be fully justified. Thus encouraged this line will construct new tonnage and strengthen its service and as a result our trade with Australasia will be largely increased. Altogether, these ocean mail routes will require from 50 to 60 steamships, of an aggregate of from 200,000 to 300,000 tons. No excessive speed is to be demanded on any of these routes, fourteen knots being the maximum on the chief South American lines, and sixteen on the chief line to the Orient. But this is sufficient for the purpose, and, indeed, marks a great advance over existing conditions in the South American trade, while at the same time these fourteen and sixteen knot ships will possess a very large carrying capacity for all kinds of merchandise.

The navy department states that it requires as an auxiliary fleet not only the fast "scouts" and cruisers to be found only in the trans-Atlantic passenger service, but a large num-

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ber of ammunition ships, supply ships, transports, fast colliers and the like of from 12 to 15 knots. The war department states that it requires transports of a speed of 12 knots. Manifestly, therefore, though the mail liners that may be constructed under the provisions of this bill will not be "greyhounds," they will be fast enough to meet the conditions prescribed for auxiliary vessels by both arms of the national defense.

The maximum cost of the proposed new mail lines, if they are all established, will be about $3,000,000 a year—this, for a dozen different lines to the ports of four continents. It is worth noting in this connection that Great Britain gives $1,600,000 a year to a single British company, the Peninsular and Oriental, that Germany gives $1,330,000 to the North German Lloyd, and France upwards of $1,500,000 each to the Compagnie Generale Transatlantique and Messageries Maritimes. Our proposed American subventions, ranging from $50,000 for the Gulf line to Mexico, to $600,000 for the long service via Hawaii to the Orient, are modest, indeed, as compared with the great expenditures of our maritime competitors. But the most experienced of American ship merchants declare their belief that on a majority of the proposed lines, these subventions will be adequate if joined with American thrift, alertness, enterprise and perseverance.

But these ocean mail services are not all. Bearing well in mind President Roosevelt's admonition, in his message to congress urging the creation of the Merchant Marine Commission, that "lines of cargo ships are of even more importance than fast mail lines," and that such vessels running "to South America, to Asia and elsewhere would be much in the interest of commercial expansion," we have made an especial provision for the encouragement of cargo vessels in the offer of subventions to such vessels at the rate of $5 per gross ton a year, or of $6.50 if engaged in Philippine commerce. This is not a bounty outright; its terms are most carefully guarded. In order to receive this subvention cargo vessels must be of a size suitable for ocean trade (at least 1,000 tons if steam and 200 tons if sail); they must be held at the disposal of the government in war; they must carry the mails free of charge; they must have a competent crew, a certain increasing proportion of whom shall be Americans; they must be seaworthy and efficient; they must make all ordinary repairs in the United States, and they must carry an increasing proportion of American naval reserve men—these men to be enrolled by the navy department out of the best officers and men of the merchant marine and fisheries, to be instructed in gunnery, etc., so that they would be of immediate use in war, and in recognition of their peculiar value to receive annual retainers ranging from $110 for a lieutenant of the reserve to $24 for a young seaman—this after the successful practice of Great Britain, the only other nation having a volunteer auxiliary service.

These subventions to cargo vessels are payable only to such as are "exclusively common carriers for the service of the public," and are not payable to vessels that leave the United States export or import trade to engage in the commerce of other nations. Deepsea fishing vessels receive the benefit of the subventions, in recognition of the peculiar value to the national defense of our hardy and courageous fishermen. Germany, France, Canada and Japan, with this same purpose in view, all foster their ocean fisheries by bounties, and the British admiralty has recently included the Newfoundland fishermen in its naval reserve.

This bill of the Merchant Marine Commission has the earnest support of the national administration, of the army and navy, and of the great and powerful mercantile associations of America. Arrayed against it is still some partisan opposition, some sectional distrust. But the opposition has steadily lessened as the bill has been debated, and its breadth of scope, its sincerity of purpose, have come to be more thoroughly understood. I do not pretend that it is a perfect measure, but it is certainly an honest one, absolutely free from anything like favoritism, and seeking in every paragraph and line to promote the interests of the entire nation. As President Roosevelt said in his message to congress on Dec. 5, 1905:

"To the spread of our trade in peace and the defense of our flag in war a great and prosperous merchant marine is indispensable. We should have ships of our own and seamen of our own to convey our goods to neutral markets, and in case of need to re-enforce our battle line. It cannot but be a source of regret and uneasiness to us that the lines of communication with our sister republics of South America should be chiefly under foreign control. It is not a good thing that American merchants and manufacturers should have to send their goods and letters to South America via Europe if they wish security and dispatch. Even on the Pacific, where our ships have held their own better than on the Atlantic, our merchant flag is now threatened through the liberal aid bestowed by other governments in their own steam lines. I ask your earnest consideration of the report with which the Merchant Marine Commission has followed its long and careful inquiry."

The senate has considered the report, and, after thorough debate, has passed the bill. It has done its duty. The complete fulfillment of the desire of the administration, and of the pledge of the platform on which Theodore Roosevelt was elected president, rests now with the speaker and the house of representatives.

IMMENSE WHITE OAK TREE.

The D. L. Helman Lumber Co., Warren, O., recently felled one of the largest white oak trees in Ohio on the farm of C. K. Shipman in Gustavus township. When cut the log measured 69 ft. in length, the diameter of the stump being 7 ft. As 7 ft., however, is not up to standard grade, the log was cut down to 62 ft. At that length it contained 7,365 ft. of lumber, board measure. Its weight was thirty-eight tons. No wagon bridge was capable of sustaining this weight and the log was hauled by ten teams with tackle blocks to the Lake Shore railway adjoining the Shipman farm from whence it was taken to the Helman yard. This immense stick of timber will be dressed down to a 30 by 30-in. timber 62 ft. long, and will be utilized as a dredge spud. It will be shipped to James D. Leary, of New York, who furnishes dredging firms and ship builders with heavy timber.

The D. L. Helman Lumber Co., of Warren, makes a specialty of dealing with long planks for ship timber. This particular log, however, is the largest they have ever received. Its grade is perhaps appreciated in the fact that while it contains 7,365 ft. of lumber, the average run of white oak trees is less than 800 feet. As the tree had far more than 1,000 rings upon it it was centuries old before Columbus ever discovered this country.

WILL HAVE TURBINE MACHINERY.

The two new liners now being built for the Toyo Kisen Kaisha, operating between San Francisco and Oriental ports, are to be fitted up with turbine machinery according to the latest advices from England, where contracts for the machinery have been placed. The steamers themselves are being constructed at the Mitsui Bishi Kaisha yards, at Nagasaki, and will be ready for business in about two years.

The new side-wheel steamer South Shore built by the Fore River Ship Building Co., Quincy, Mass., for the Nantasket Steamboat Co., Boston, was launched recently. This vessel is 207 ft. long and 32 ft. beam.

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LAKE UNDERWRITERS AND INLAND LLOYDS.

The annual meeting of the Lake Underwriters and Inland Lloyds, held in Buffalo on the 13th and 14th, brought out a full attendance of interests. President J. S. Gadsden, of Chicago, occupied the chair and Secretary A. H. McDonnell, of Detroit, took his usual position. Both were re-elected. There was the usual amount of exchange of ideas and rather informal discussion and small amount of business done that is tangible to the public eye. This is the only regular gathering of these interests during the year and the conditions that have to be met are so very different from what they were that the meetings are a sort of Sunday school picnic in comparison.

This is not to say that there are not many and grave problems to encounter, for there are and they are if anything more serious than they used to be. With the vulnerability of the steel bottom, the heavy storm losses and the disposition of the big vessel owners not to insure, all very present troubles for the underwriter to struggle with, he has been getting the worst of it lately, which makes the case all the more puzzling.

There is no more of the old spirit of intrigue among the underwriters, such as had its culmination 20 years ago or so with Lorenzo Dimick's "big four" companies and there does not now appear to be much dictation on the part of the English underwriters, as the odd thing about it all is that about as soon as the aid from London, so much needed a while ago, was obtained in full it was no longer needed, so that the home companies are fully equipped to take care of the business if there is a disagreement, which makes all the difference in the world in the matter of arbitrary dictation.

So it was merely given out at the meeting that the English underwriters insisted on rates as high as they were last year and that was about all. As there was no idea of lowering them, in the face of the great losses of last season, there was no friction arising from that source and steel hull rates were left as they were last year. Though steel hull losses were so heavy last season it is still felt that the wood hull is the poorer risk and it was found impossible to establish any rates on wood and the matter was left to a special committee, composed of W. J. Sandrock and H. S. Sill, of Buffalo, to make an early report on.

This is about equal to saying that the wood hulls are a greater problem after all than the steel hulls and the board does not care to take the responsibility of fixing rates on wood and will leave the matter practically to individual underwriters. What the committee report is to be cannot be outlined, but it is admitted that it will not fix any exact rates. So these rates will go up as a rule and it is held that they ought to.

This is again the turning year between metal and wood hulls. Until now there has been half as much tonnage in wood as in anything else, but metal has now made another stride and will soon be far in excess of wood. Of the 2,251,156 tons represented in the lake fleet 1,453,495 tons are steel, with a few iron and composite not included. In his annual report Manager Drake, of the *Inland Lloyds Register*, states that he has included everything that came out up to Nov. 1 except the A. B. Wolvin, James C. Wallace and the Hoover & Mason, which for special reasons were not classified. The Wolvin was never classified and the Wallace is practically a duplicate of her. The Hoover & Mason will be given a class this season.

Manager Drake has taken a decided stand in his report regarding the lengthening of vessels. Even where the former limit of 72 ft. additional has not been exceeded he declares that the vessel is likely to be made logy and less seaworthy, not to mention the doubtful practice of joining new material to old. It is found that the fate of the Sevona, along with other adverse showings, has made lengthening unpopular, so that the Penobscot appears to be the only one undergoing that change this winter. She falls under especial condemnation because she is to be given 96 ft. additional length. The manager declares that he will give her no rating.

The new *Register* is now in print and will be found much the same in form as usual, the only change of account being the sometimes individual, but more often horizontal increase in the valuation of steel hulls. The total valuation of the rated fleet of 1,742 craft is $103,749,100. This will be considerably added to when the lakes open for the season's business next month.

INSTRUCTIONS TO STEAMBOAT INSPECTORS.

Supervising Inspector General George Uhler, of the steamboat inspection service has sent the following letter to supervising and local inspectors throughout the country.

"It is imperative that the attention of supervising, local and assistant inspectors, and all employes of this service, should again be called to the necessity of exercising and demanding a strict and rigid observance of the laws and the rules and regulations governing this service.

"Inspection must be carefully and thoroughly made, and must be in strict conformity with the provisions of the law and the rules and regulations made in accordance therewith, and no part of the equipment of a vessel must be passed unless it is up to the requirements in every particular. The conditions of the vessel itself must be such as to assure, without doubt, her seaworthiness and efficiency, as well as her capacity and adaptability for the service in which she is engaged. Defective equipment must not, under any circumstances, be allowed to remain on board the vessel while being navigated, but must be removed until placed in proper condition, and again examined and passed by the inspectors. Condemned life preservers and fire hose must be destroyed by the master, owner or agent of the vessel, in the presence of the inspector. The rules governing boat and fire drills must be rigidly adhered to, and the drills must be witnessed by the inspector at the time of inspection, and, in addition thereto, as often as possible between inspections. Inspectors noting or being advised of any violation of the law or of the rules and regulations must take cognizance of the same at once, and report the offender to the proper authorities, and also take steps to revoke or suspend the license of the offender, if he be a licensed officer, if an investigation justifies such suspension or revocation.

"Inspectors must see to it, as far as may be possible or practicable, that the provisions of the law and the requirements of the rules and regulations are closely observed by masters and owners of vessels within their district, and will be held to a strict accountability for the condition of the vessels under their jurisdiction. Inspectors must impress upon masters and owners of vessels the importance and necessity of frequent boat and fire drills, also the drill with the line-carrying gun, and call their attention to the penalty for the disregard of these necessary precautions. Inspectors must realize that the efficiency of the service and the safety of those people who take the chances of the sea, depend almost entirely upon an intelligent interpretation and application of the law and the rules and regulations by the inspectors and a persistent determination upon their part to see that they are carried out in the strictest sense and in accordance with their true intent and purpose. No influence, no excuse or no persuasion must be allowed to stand in the way of a strict enforcement of the law, and of the rules and regulations in all their details. Failure upon the part of the masters and owners to maintain their vessels and equipment in proper condition, or failure to see that the requirements regarding boat, fire and gun drill and other things pertain-

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ing to the safety of life and property are strictly observed and carried out, will be made the basis of immediate action by the inspectors. Failure upon the part of inspectors to carry out to the fullest extent the provisions of the law and the requirements of the rules and regulations, or indifference to their duties and responsibilities, will be sufficient cause for the extreme discipline of the department."

SCHERZER ROLLING LIFT BRIDGES.

During the past year many railroad companies have been called upon to increase the number of tracks to accommodate rapidly growing traffic. This has caused the removal of a number of single and double-track swing bridges and their replacement by modern Scherzer rolling lift bridges. With this modern type of movable bridge any number of parallel tracks can be added from time to time to meet the expanding requirements of traffic without interfering with or disturbing the existing Scherzer rolling lift bridge or traffic thereon, consequently saving large sums of money and expediting traffic with increased safety.

One of the inherent limitations of the center-pier swing bridge is the fact that it cannot be enlarged or widened to accommodate additional tracks. It must always be discarded and removed at a great loss and also disarranging traffic, for if a new swing bridge were constructed along side of an existing swing bridge, it would be impossible to operate either of them because they would interfere with each other.

Increased number of tracks is now called for by the progressive railroads preparing to use electric locomotives in place of steam locomotives. Where such improvements are made, it results in greatly increased traffic requiring additional tracks. The New York, New Haven & Hartford railroad has recently placed into service two double-track Scherzer rolling lift bridges, built side by side, forming their new four-track bridge at Westport, Conn. This bridge replaces a center-pier swing bridge which was superseded and removed to accommodate increased traffic. The two double-track Scherzer rolling lift bridges forming the new four-track bridge at Cos Cob, Conn., are rapidly nearing completion and expected to be placed into service within a month. The two double-track Scherzer rolling lift bridges across the Housatonic river are also progressing rapidly and will be placed into service within a few months. The substructure for the very long span Scherzer rolling lift bridge across the Connecticut river is nearing completion and the manufacture of the superstructure is making rapid progress in the bridge shops. The new Scherzer rolling lift bridge will be a double-track structure, replacing a single-track swing bridge. It is intended that this double-track Scherzer rolling lift bridge will be enlarged to a four-track bridge within a few years by building another double-track Scherzer rolling lift bridge along side of the first one and operating both of them either jointly or separately, as desired, with one operator. Work has recently commenced on the four-track Scherzer rolling lift bridge across the Neponset river, replacing a double-track swing bridge. The plans of a six-track Scherzer rolling lift bridge across the East Chester bay and another six-track Scherzer rolling lift bridge across the Bronx river have been completed. The new bridges will replace one double-track swing bridge and one four-track swing bridge, no longer adequate for the increased traffic. These modern bridges are designed to carry the heaviest engine loadings, and when completed will accommodate and facilitate with increased safety the rapidily growing traffic of the New York, New Haven & Hartford Railroad Co.

The large double-track Scherzer rolling lift bridge, having a movable span of 160 ft., constructed for the Newburgh & South Shore railway, Cleveland, has proved so rapid, successful and economical in operation that the Baltimore & Ohio Railroad has decided to remove their single-track swing bridge at an adjacent crossing and replace the same with a double-track Scherzer rolling lift bridge, practically a duplicate of the Newburgh & South Shore bridge. This railroad company is also building a long span single-track, single-leaf Scherzer rolling lift bridge, 230-ft. span, center to center of bearings, to replace a center-pier swing bridge near the mouth of the Cuyahoga river, Cleveland. The new bridge will be erected in its open position without interfering with the railroad traffic across the present bridge or the vessel traffic on the river, and when completed, ready for traffic, will be operated into its closed position and immediately used by the very heavy and frequent railroad traffic at this point without causing any delay whatever.

The Scherzer rolling lift bridge constructed across the Suir river, Ireland, for the Fishguard & Rosslare railways has been completed. The new bridge is intended to facilitate the traffic of this modern high-speed line, which has been constructed to shorten the time and distance between Queenstown, Cork and the south of Ireland and London.

The Scherzer rolling lift bridge constructed across the Swale river for the South Eastern & Chatham railway on the fast mail route to the continent has been so rapid in operation and satisfactory that it has induced the Dutch Railroad Co. to adopt a three-track Scherzer rolling lift bridge now under construction across the Haarlem river on their main line fast mail route.

The traffic of the Buenos Ayres Great Southern railroad has expanded so as to require a double-track line. This company is removing their single-track bridge across the Raichuelo river, Buenos Ayres, and replacing the same with a modern double-track Scherzer rolling lift bridge.

In addition to the very large number of railroad Scherzer rolling lift bridges constructed and in successful operation for the principal railroad companies in the United States and abroad, more than forty electric railway and highway bridges of this type have been constructed and placed under construction. The record of this company includes the largest and most important movable bridges constructed throughout the world during the past ten years.

BOOK REVIEWS.

Carl C. Thomas, professor of marine engineering, Sibley college, Cornell university, has just written a book entitled "Steam Turbines." In it he reviews the turbine from its earliest stage until the present time, concluding with a chapter on the marine turbine which he brings down to the Cunard liner, Carmania. In his preface he says that in writing the book he has aimed to give in logical order the fundamental principles of steam turbine design with examples of their application and to show the results obtained in engineering practice. The development of the steam turbine has been so rapid that many of the problems involved, while solved more or less satisfactorily for construction purposes, have not been put upon a scientific basis. Foremost among these problems is that of the velocity of steam flow under given conditions—important not only for an understanding of the operation of the turbine, but for predicting the results to be expected from a given set of conditions. The author's principal incentive has been the desire to analyze and correlate the results of certain experimental investigations and to show how these results are to be used in connection with the well-known laws of hydraulics and thermodynamics as applied to steam turbines. In stating these laws the author has attempted to develop the expressions in a simple and direct manner and to give numerical and graphic solutions illustrating the principles involved. The price of the work is $3.50. For sale by the MARINE REVIEW.

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DEVELOPMENT OF FORMOSA BY JAPAN.

The development by Japan of the island of Formosa, lying about 100 miles north of the Philippine group, is discussed somewhat at length by two publications of the Japanese government, which have just reached the department of commerce and labor through the bureau of statistics, one entitled "Japan in the Beginning of the Twentieth Century," and the other "Fifth Financial and Economical Annual of Japan." These show that Formosa, which was subjected to military government for a short time after its transfer from the control of China to that of Japan, was in 1896 given a civil government directed by the government of Japan. A single great military expedition sent throughout the island terminated hostilities among the natives, except as to the small element known as the "Head-Hunters" in the inaccessible forests of the interior, who will probably submit only when their haunts are invaded through the spread of cultivation. The foremost requisite to effective control was communication. Thus far about 1,200 miles of roads have been built. A line of railway 232 miles long was constructed from near the southern to the northern extremity of the island, being opened to traffic throughout its length, May 15, 1905. Postoffices were established, their number in 1903-4 being 117, with 7,608 miles of postal routes, and the number of pieces of mail handled in 1903-4 being 13,792,551, against 5,237,279 in 1896-97. In 1903-4 the telegraph lines, 908 miles long, delivered 1,027,471 messages, while the telephone lines, 307 miles long, delivered 3,578,267 messages.

Education, the distinguishing feature of modern Japan, received immediate attention. The system is divided into three departments, according to the three classes of the population: (1) Japanese immigrants (42,124); (2) Chinese settlers and their descendants (2,788,633); (3) Malay aborigines (94,315). For the Japanese immigrants 60 teachers are provided, whose pupils in 1904 numbered about 2,000. The Chinese have 130 schools, with 521 teachers and about 18,000 pupils. Besides these there are about 1,800 "family schools" of the old style, with some 32,000 pupils. The medical school at Taihoku, with the instruction conducted in Japanese, has 130 students, with a five-year course. The national language school is intended to teach Japanese to the native children and the native languages to Japanese children, and it also comprises a technical course. The normal school trains native youths as teachers of native primary schools. A number of graduates have already been turned out. Five main schools and 11 branch schools have been established for the aborigines. In addition to these there are missionary schools, both Christian and Buddhist, as well as a museum and a library.

Hygiene received immediate and careful attention. Numerous artesian wells were provided, supplying pure drinking water for the inhabitants, more than 800 such wells being located in the district of Taihoku, which comprises about one-tenth of the population. In the capital of that district extensive waterworks were built. Sewerage was introduced in a number of cities. Nine large towns have hospitals, many smaller places have branch establishments of that kind, and more than 200 physicians are practicing on the island. The number of deaths from the plague fell from 2,619 in the first half of 1901 to 606 in the same period in 1903.

The natural resources of the island are so great that the introduction of an enlightened and energetic government seems likely to result in a vast increase of production. The production of rice increased from 21,300,000 bu. in 1900 to 36,500,000 bu. in 1903. In sugar there has been an increase from 63,767,398 lbs. in 1900 to 110,125,261 lbs. in 1904; in sweet potatoes, from 456,625,465 lbs. in 1900 to 1,194,279,891 lbs. in 1903; in ramie, from 1,359,344 lbs. in 1900 to 3,469,893 lbs. in 1903. Jute increased from 1,970,459 lbs. in 1900 to 3,641,529 lbs. in 1903; tea decreased from 23,072,958 lbs. in 1900 to 18,667,831 lbs. in 1903.

The production of gold increased from 11,140 troy ounces in 1900 to 29,635 troy ounces in 1903, gold dust from 1,142 troy ounces in 1900 to 19,410 troy ounces in 1902, dropping, however, to 9,188 ounces troy in 1903, coal increased from 41,835 long tons in 1900 to 74,264 long tons in 1903, sulphur from 731 long tons in 1900 to 1,336 long tons in 1903. The principal industrial products are camphor and camphor oil. These are of special interest, because Formosa is the world's chief purveyor of camphor. The production of camphor declined from 4,627,308 lbs. in 1900 to 4,508,610 lbs. in 1904, while that of camphor oil increased from 3,141,604 lbs. in 1900 to 3,618,116 lbs. in 1904. The wasteful methods in this industry led to the government in 1899 to declare it a state monopoly. This put a limit on production as to season and locality and in the number of trees to be felled. The refiners are obliged to sell their half-finished product to the government, which in turn sells most of it to a monopoly agent, at present a British firm. The native process of refining has been entirely superseded by the Japanese process. The difference between the two may be illustrated by the fact that the camphor oil, almost equal in importance to the camphor itself, was formerly allowed to go to waste. It is estimated that at the present rate of consumption the camphor trees now on the island would last forty or fifty years. The government has already taken measures to secure a permanent supply by planting millions of young camphor trees.

Trade between Japan and Formosa has in recent years been growing with great rapidity, while trade between Formosa and foreign countries has remained practically stationary. In 1898 the exports to Japan were 3,216,149 yen; in 1904 they were 10,431,307 yen. The imports from Japan in 1898 were 4,599,317 yen; in 1904 10,156,311 yen. To foreign countries the exports in 1898 were 12,827,190 yen, while the imports from foreign countries were 16,875,405 yen; in 1904 the exports from Formosa to foreign countries were 12,391,124 yen, while the imports from foreign countries were 12,838,443 yen. (The Japanese yen is equal to $0.498.)

In exports from Formosa the order of magnitude of the trade of various countries (other than Japan) in 1904 was as follows:

	Yen.
China	7,175,202
United States	2,870,854
Hongkong	1,628,725
Great Britain	277,141
Germany	76,000

In imports from foreign countries to Formosa the order of magnitude in 1904 was as follows:

	Yen.
China	5,842,425
British India	1,681,907
United States	1,452,047
Great Britain	1,374,984
Hongkong	262,274
Asiatic Russia	189,060
Germany	184,825

Exports from Formosa to the United States, after dropping from 1,188,184 yen in 1897 to 309,642 yen in 1899, have since then been almost continuously rising to their present figure, 2,870,854 yen, while imports from the United States into Formosa, 811,660 yen in 1897, have pursued an irregular course to their present figure of 1,452,047 yen, reaching their maximum of 1,517,981 yen in 1900.

CHARLES HENSON'S ADDRESS WANTED.

The address of Charles Henson, a mate on the great lakes, is wanted. Does anyone know it?

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THE SHIPPING BILL.

Today (Thursday) is the today when every American who has the interest of his country at heart should pray for the upbuilding of its merchant marine. Today this great question is to be considered by congress. If there ever were a time to strike a crucial blow for the betterment of oversea conditions, that time is now. Never before has the country been so well informed concerning the necessity of a capable oversea fleet, operating under the American flag, as now. Manufacturers, bankers and farmers have been brought to think acutely upon the subject and series of resolutions have been adopted by commercial bodies in favor of governmental aid to shipping. Nearly all of the great departments of the executive division of our government have publicly declared in favor of the necessity of a merchant marine in the foreign trade. They feel the need of it. The war department, charged with the preservation of law and order in the Philippines, knows that in the event of a pressing emergency it would be impossible to quickly mobilize a force there. Why? Because there are not enough American ships. The postal department knows that service is inefficient to various quarters of the globe. Why? Because there are not enough ocean mail routes. The department of commerce and labor knows that the balance of trade with South America is on the wrong side. Why? Because there are no American lines leading to that country. The bill which is on trial today seeks to remedy all this. Therefore pray!

SCIENTIFIC LAKE NAVIGATION.

Lake masters will find much of great interest to them in the course of instruction in lake navigation which will begin in the April 5 issue of the MARINE REVIEW. The course will be simple, practical and easily understood. Mr. Clarence E. Long's reputation as a teacher is the assurance of this. It is not so long ago that it was most difficult to induce lake captains to study true navigation. Being pilots some of them prided themselves on this fact and persistently refused to learn even those simple problems of navigation which would be not only of extreme value to their owners, but to their own professional reputations. Now, all this has been changed within a year back. What is the reason for it? In the first place many of them have learned certain things about navigation in a mechanical way, and after applying them have seen their advantage and they have not been slow to improve this knowledge. They have also come to the conclusion that they can learn navigation as well as anyone when it is explained to them in a common-sense way. They have always been led to believe that navigation was a most difficult science to learn, and well they might when one considers the manner in which it has, in years passed, been presented to them. They have been led to believe that the word "navigation" means navigation as applied on the ocean, finding position from astronomical sights, etc. In the first place they could not see where this knowledge could be practically applied. No study is interesting nor is there much benefit to be derived from it unless it is shown where such knowledge can be and is applied. This has been the great fault of the navigation works of the past. Think of a person taking up the study of navigation and studying all the branches of arithmetic for months without an example or even a mention made of its application to problems of navigation. True, arithmetic is the foundation of navigation, but unless its application to navigation is shown at once it becomes discouraging even to a student, let alone one who has not done much studying, but is desirous of learning the "whys" of his profession. This is the system that many books and schools adopt in the teaching of navigation. Is there any wonder then that so many men have a wrong impression of this matter, and are ignorant of the real conditions. Ninety-five per cent of the men sailing boats, as well as the mates, can learn navigation if they just make up their minds to. The MARINE REVIEW, in publishing this course of instructions, virtually offers every man on the lakes and seaboard a course of navigation free of cost. No man can claim that he has not had the advantage of procuring this information simply be-

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cause he is outside of the range of the regular or the private navigation school. It is for this reason that the REVIEW is to publish this course of instructions.

Following is a brief description of the first lesson in navigation:

The subjects in arithmetic contain nothing but such matter as will be useful to the student in his subsequent studies, and in his career as a practical navigator. No previous knowledge of arithmetic is necessary beyond the four fundamental rules—addition, subtraction, multiplication and division. The scientific formulas upon which the various problems are based are not considered, but clear, common-sense explanations are given in their stead, so that the subjects become intelligible to even those who know nothing of arithmetic beyond its fundamental principles.

The first lesson—arithmetic—is in four parts; the first portion deals with the circle and shows the relation and application of the degree and its divisions with the points of the compass, and the addition, subtraction, multiplication and division of degrees, minutes and seconds of the circle are fully explained. The second and third portions of the first lesson consist of a full and clear explanation of fractions and decimal fractions, and the fourth part is a paper on simple proportion, or the rule of three, as it is called in navigation. In these subjects the important facts that form the ground-work of navigation are stated clearly, concisely and completely. Illustrations and diagrams are used to make the text easier to understand. This is absolutely all the arithmetic that the beginner need know in order to start the learning of practical navigation. It is the only and proper method of beginning the study. Students who have tried to learn navigation from other navigation courses of study, which, in the very go-off start the student to learning algebra, geometry and mensuration, will appreciate the arrangement and system of our study. Mensuration and the rudiments of geometry and algebra are included in our course, but they are not given to the student until such time as they can be applied to the study of navigation. This portion of the arithmetic is published in and among the lessons and is learned piece-meal by the student, and only as he progresses with his navigation. By such method the student can plainly and readily see where this part of mathematics is utilized.

Many marine men and others who tried to learn navigation have experienced this difficulty and were compelled to flounder through intricate examples that seemingly had no bearing or relation to navigation, and instead of the study being a pleasure it became a burden.

The New Bedford Steamboat Co., of New Bedford, Mass., is having a new steamer built for the run between Cuttyhunk and Nonquit. The steamer is building by the Robert Palmer & Sons Ship Building & Marine Railway Co., Noank, Conn., and will be called Gosmold. The new vessel is 119 ft. 9 in. over all, 24 ft. molded beam and 9 ft. deep. She will be supplied with two fore and aft compound engines, 11 and 25 in. cylinder diameters by 16-in. stroke, built by James H. Paine, Noank, Conn. Steam will be supplied by two Almy water-tube boilers.

AVERAGE DEPTH OF WATER PER MONTH.

Naturally great interest attaches to the stages of water in the great lakes since, with the increased capacity of the ship an inch or two of added depth means considerable more cargo per trip. Through the courtesy of Supt. Joseph Ripley, at the Sault and Lieut. Col. Charles E. L. B. Davis at Detroit, the MARINE REVIEW is enabled to present tables showing the average depth of water per month for the past ten years, at the two most important points on the lakes—the Poe lock and the Lime Kiln crossing. These figures will hereafter be given annually for the benefit of vessel owners.

DEPTH OF WATER IN POE LOCK.

MONTHLY AVERAGES FROM DAILY READINGS.

Year	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.
1896	.....	.....	.....	.....	20 48	20.34	19 68	19.78	19 69
1897	19 36	19 82	20 22	20 03	20.80	20 60	20.31	19 99	19.77
1898	19 33	19 61	19 99	20 35	2 / 39	20 30	20.10	19.96	19 89
1899	20 01	19 94	20 47	20 84	20.98	21 01	20.70	20.44	20 37
1900	19.82	19.70	19.80	20.18	20 52	20.94	21 02	20 86	20.59
1901	20 11	19 96	20 20	20 39	20.60	20.17	20.08	19.72	19 42
1902	18 76	19 09	19.31	19 74	19 86	19 80	19.47	19 41	19.16
1903	18 95	19.33	19 55	19.84	19.97	20 08	20.01	19 71	20.31
1904	20 08	19 93	20 46	20 62	20 70	20.77	20.77	20 43	20.29
1905	19 89	20 04	20 29	20 70	20 75	20 78	20.72	20.43	20.14

DEPTHS IN THE CHANNEL AT LIME KILN CROSSING, DETROIT RIVER DUE TO FLUCTATIONS IN THE WATER SURFACE FOR THE PERIOD 1897 TO 1905 INCLUSIVE

Mean depth, in feet, at Lime Kiln crossing

Month	1897	1898	1899	1900	1901	1902	1903	1904	1905
April	18 5	18.7	18.4	18 4	17.6	17.8	19 5	19.5	18.2
May	18.8	19.0	18.7	18 8	17 8	18.3	19.6	19 2	19.0
June	18.9	19 1	18 9	18.9	18 2	18.6	19 4	19 9	19.4
July	19.0	19.0	18 9	18 6	18.4	19 2	19 4	19.9	19 5
August	18 8	18 8	18.7	18.7	18.3	19 2	19.2	19 6	19.4
September	18.5	18 4	18.3	18.4	18.2	18.8	19 0	19.3	19.1
October	19.1	18.2	18 1	18.2	17.8	18.7	18 6	18 9	18.6
November	17 7	17.9	18 0	17.7	17 5	18 4	18.1	18 4	18.2
December	17 8	17.9	17 5	17.8	17 8	18 2	17 9	18 3	18.3

NOTE.—During 1897 and 1898 the place of limiting depth was at Ballards Reef, Detroit river where the depth was about 1.5 feet less than that at Lime Kiln crossing. During 1899-1901 the place of limiting depth was at Amherstburg Reach, Detroit river where the depth was about 0.5 feet less than that at Lime Kiln crossing.

The reports from the regular and display stations of the weather bureau indicate that the cold weather and northerly winds have made material change in the ice conditions of all the lakes except Ontario. In Superior the fields moved to the extreme western end with northeast winds, but have moved out again; there is more ice reported over the middle section of the lake; over the eastern portion the field extends from Whitefish bay westward to beyond Point Sauble. Solid ice extends from Point Iroquois to Detour in the St. Mary's river. In Green bay the ice has increased in thickness. In Michigan ice fields are reported over the extreme southern portion and along the east shore to the Straits. The ice at the Straits is more extensive than was reported last week and is solid. In Huron there is more new ice in Thunder bay and the field over the southern portion is intact and extends beyond vision. The ice bridge in the St. Clair river is solid. The western end of Erie is covered with an extensive field and all stations along the south shore report that the ice field extends beyond vision; no change over the eastern end. No fields are reported in Ontario. In comparison with same period last season there is less ice in all lakes and it is not so heavy. The condition reported this week is the most serious of the season.

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FREIGHT SITUATION.

Vessel owners who look northward from their windows in the Rockefeller and Perry-Payne buildings in Cleveland do not observe in the physical aspect of things a presage of an early opening of navigation. Winter seems to have settled now with more determination than it has exhibited since it began and ice everywhere is quite as thick as it was this time a year ago. On the whole, this condition is not taken with a rueful visage. The independent vessel owner is quite content to let the opening of navigation wait awhile since he is well aware that the lake trade is singular in the fact that if its freight is not moved by lake it is not moved at all. He knows well enough that the ore and grain will be waiting for him whenever he sends his vessel after it with the added advantage, if the opening is delayed, of a firmer rate and a better assurance of continued employment. This condition is what makes for the security of the vessel business on the great lakes. In nearly all other avenues of transportation throughout the country commodities may go forward by rail if they cannot go by water but so enormous is the lake trade in a few single items that the railways could not possibly handle it if they cared to. It must wait for the ship and as some of the independent vessel owners have not as yet lined up all the ore they can carry they are not anxious for an early opening of navigation.

Nor is there any likelihood of any attempt to force it even on the part of the great steel making companies which, of course, are desirous of having as early an opening as possible. Last year's experience of bucking the ice is sufficiently green to warrant a decade's respect at least. That attempt was made upon misinformation, otherwise it would not have been made at all. It would be interesting to know exactly what that experience cost the vessel owners. It was probably not far from $1,000,000. A Cleveland vessel owner, operating a fleet of ten vessels ranging from 7,500 to 3,000 tons carrying capacity, has prepared the following figures of his loss by reason of that misguided effort to force the opening of navigation. The average loss of time in the ice and making repair to each vessel was ten days. The figures are as follows:

Operating expenses per day on actual cost for season—$2,117.71 x 10 days	$21,177.10
Earnings per day based upon average earnings per day for season—$1,021.61 x 10 days	10,216.10
Cost of repairs not recoverable from insurers of vessels	1,873.16
Actual total loss to fleet	$33,266.36
To which may be added the repairs made to vessels at the cost of the vessel underwriters	8,127.24
Making the total amount on account of the above fleet	$41,393.60

This shows a loss of $4,139 per vessel and is probably an accurate index of the loss of each vessel that made the attempt.

No further chartering has been announced in the ore trade, but as a number of vessel owners have by no means got all the contract ore that they can care for, it is evident that the Steel Corporation must come into the market later for additional tonnage. There is an abundance of ore in the stock piles of the leading steel making interests of the country who are therefore prepared to plan a siege if they have to, but some of the smaller independent furnaces are living from hand to mouth. Nearly every vessel in Lake Erie ports is holding a cargo of coal and there is sufficient reserve available for several trips. Everyone is hoping that there will be no coal strike but if there is one its effect will be minimized by the abundant supply now available.

Navigation between Cleveland and Detroit has been temporarily suspended. The steamers of the Detroit & Cleveland line will not attempt to make the trip until ice conditions moderate. Ice has been making steadily in the rivers during the past few days.

DOCK MANAGERS' CONFERENCE DECLARED OFF.

A conference between the dock managers and the representatives of the International Longshoremen's Association was broken off suddenly last week by the interjection of an entirely extraneous issue into the controversy. After the dock managers had been in session for ten days with the representatives of the labor union, they were suddenly notified that no agreement could be arrived at until a committee which had been appointed by the longshoremen to call upon Cleveland vessel men and ascertain their attitude towards the mate's union had reported, and action had been taken upon it by the longshoremen. The conference thereupon came to an end, the dock managers feeling that it would be useless to continue under the circumstances. The following communication, signed by Mr. E. M. Pierce, chairman of the dock managers, was sent to President Keefe, of the Longshoremen's Association:

"The committee of dock managers has received a report from your conference which reads as follows: 'That we are willing to go on with the conference with the understanding that no agreement can be signed until the I. L. M. & T. A. committee, which has been directed to wait on the Lake Carriers, make their report and the report is acted upon by the I. L. M. & T. A. conference in behalf of the mates.' The dock managers cannot conceive the wisdom of your position and wish to express to you and your organization that the delay of our present mutual conference rests solely with you. We have met in joint conference for seven years and have effected satisfactory agreements which have been free from all outside influence. The basis for our negotiations in this conference must be free from any outside influence now as it has been in the past."

The dock managers during the past week have expressed considerable indignation that President Keefe should have permitted the conference to continue for ten days without intimation that he intended to make a settlement contingent upon another action altogether. The dock managers maintain that they are concerned only with the operation of the docks and that they have no interest whatever with the mate's union, which is an affair of the vessel owner exclusively. No date has been set for a resumption of the conference. The present agreement with the Longshoremen's association expires May 1.

Vessel owners in general express but little concern over the affair. They say that their attitude towards the mates was defined at the annual meeting of the Lake Carriers' Association and that they have no intention of changing it. The mates are being engaged by the masters, and as far as could be learned, had generally signed for the season of 1906 before the dock managers' conference began. Vessel men are almost unanimous in expressing surprise at this latest move of Mr. Keefe and do not believe that his present position is one that can be well defended. He has always been faithful to a contract made and undoubtedly the present agreement which does not expire until May 1, will be faithfully carried out by him.

As a result of Mr. Keefe's attitude, the conference with the package freight lines had also to be called off. President Keefe met the representatives of the package lines in Cleveland last week and announced that no agreement would be made with them for handling cargo unless mates were carried that are members of the Lake Pilots' Protective Association. The Anchor, Mutual, Rutland and Sault lines were represented at the conference, but the managers felt that

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they could not do business on the lines laid down by Mr. Keefe and the conference was called off.

The next conference with labor will be the Lake Seamen's Union at Detroit on Monday next. The Lake Carriers anticipate no difficulty in making a satisfactory arrangement with this union which will also act, not only for seamen but for the cooks and stewards. The committee of the Lake Seamen's Union which will meet the Lake Carriers will be: Wm. Penje, Chicago, general secretary for the lakes; Victor Olander, Chicago, recording secretary; James Scanlon, Detroit; Thomas Lester, Tonawanda; George Hanson and L. Fitzpatrick, Buffalo; Al. Pierce and John Buckley, Milwaukee; Wm. Curry, Cleveland and Wm. Roberts, Chicago.

GOODRICH LINE STEAMER ATLANTA BURNED.

The steamer Atlanta, of the Goodrich line, burned to the water's edge between Sheboygan and Port Washington on Sunday last. The Atlanta left Sheboygan at 10:30 o'clock Sunday morning for Milwaukee. She had proceeded on her way scarcely over an hour when the crew of the fishing tug Tessler noted that the steamer had stopped in her course, though they could discern nothing wrong with her. As, however, she made no effort to resume her course the tug started toward her, impelled more by curiosity than by the knowledge of any danger. When they neared the Atlanta they discovered that she was on fire and the crew and passengers were making frantic efforts to launch the small boats. They succeeded in landing three of them but the fourth one took fire before it could be got into the water. There were sixty-one passengers aboard but they were all picked up by the Tessler. The sister ship Georgia, bound from Milwaukee, hove in sight and the passengers were transferred to it. The hull of the Atlanta was beached by the tug Tessler. Only one life was lost, Michael Hickey, a deck hand, who was drowned.

AROUND THE GREAT LAKES.

The new steel freighter James Laughlin will be launched from the Ecorse yard of the Great Lakes Engineering Works on March 31.

The steamer Harvey D. Goulder, building for Henry Hawgood at the Lorain yard of the American Ship Building Co., will be launched on March 31.

Mr. C. L. Scoville, an old lake engineer, has a new check valve that will be used on a number of the new steamers that will come out this season.

Mr. Harry Coulby, president and general manager of the Pittsburg Steamship Co., was initiated as an associate member of the Ship Masters' Association last week.

The Parker Bros. Co., Ltd., Detroit, have purchased dock property from Edward and Albert Schmidt, between Dubois and St. Aubin avenue, Detroit, and will use it as a coal dock for fueling vessels.

The collier Marquette & Bessemer No. 1 cleared for Rondeau from Conneaut last week on her first trip of the season. While this vessel is a collier she was constructed after the manner of a car ferry and is an excellent ice crusher.

The fleet of the Pittsburg Steamship Co. consisting of seventy steamers and thirty barges carried during the season of 1905 11,341,539 tons of iron ore and 557,825 tons of miscellaneous freight. The gross earnings of the fleet were $8,072,411.16.

The steamer Wm. E. Corey, wrecked last fall, is still in dry dock at the head of the lakes, but it is expected that repairs upon her will be finished by the middle of April. About 250 plates had to be taken from her hull and fully one-third had to be replaced. Many of her frames had to be taken out also and strengthened.

The Lackawanna Steel Co., of Buffalo, through its officers and directors have incorporated the Seneca Transportation Co. for the purpose of operating a fleet of steamers on the lakes. Mr. George W. Smith, of the traffic department of the Lackawanna Steel Co., will be superintendent of the Seneca Transportation Co.

When the work of repair is finished, the government will have a fog bell installed on the end of the Duluth breakwater. It will be operated from the lighthouse by a cable and an electric motor. This will be the first automatic fog bell to be placed at the head of the lakes and will be the second on the great lakes, the other being at Marquette.

A report from Chicago is to the effect that the tunnels which extend under the Chicago river will be removed early next month, thus putting an end to a controversy which has raged for years. These tunnels have been a matter of grave concern to vessel men as they have prevented the larger class of vessels from successfully navigating the river.

For saving the steamer Cormorant from burning in Niagara river last fall, a suit for $5,000 salvage has been brought in federal court at Buffalo by the owner of the tug White Haven. The Cormorant was in tow of the tug Constitution when the crew of the White Haven noticed fire aboard the steamer and went to her rescue, and succeeded in beaching her and putting out the flames. The Hines Lumber Co., Chicago, owners of the Cormorant, have given bonds for the amount of the claim.

Judge Landis, of Chicago, holds the steamer City of Berlin, of Detroit, at fault in the collision case of the Berlin and the steamer Chile. The collision occurred in the Detroit river near Belle Isle, and the City of Berlin was sent to the bottom. She was raised and towed to Manitowoc, where she was repaired. The Berlin was out of commission for a long time and a claim for about $75,000 was made by Henry Wineman, her owner. The owners of the Chile did not make any claim for damages.

The board of supervising inspectors of steam vessels has completed its labors at Washington but as the deliberations of this body have first to be passed upon by the department of commerce and labor before they can be published, it will be several months yet before it is definitely known what was accomplished. It is understood, however, that no radical changes have been recommended, but certain minor ones have been made to render life more secure aboard ship. For instance, lake freighters are to have telephones from the pilot house to the engine room and also lines along the deck about 5 ft. from the rail from forward to aft. It is understood that the proposition advocated in some quarters to build a passage way under the deck was regarded as impractical.

After the committee on merchant marine and fisheries of the house of representatives heard from a delegation of lake vessel men, headed by Mr. Harvey D. Goulder, counsel for the Lake Carriers' Association, the provision in the Golden bill requiring 75 per cent of the deck crews of passenger vessels to be able seamen, was struck off. Accompanying Mr. Goulder were Mr. T. F. Newman, of the Cleveland & Buffalo line, Mr. A. A. Schantz and Mr. D. C. McIntyre, of the Detroit & Cleveland line, Mr. B. W. Parker and Capt. Nicholson, of Detroit and Mr. A. W. Goodrich, of Chicago. It was proved to the committee that the representations made from the lake region by the advocates of the bill had not even the merit of truth to commend them. As a result of the testimony submitted by the owners of the passenger fleets the committee struck the provision out in so far as the lakes are concerned.

Although inundated for nearly forty years, the piling removed from the old No. 1 South Shore ore docks at Mar-

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quette are sound and in nearly as good condition as they were in 1868, when the dock was built. The new dock now in course of construction on the site of the No. 1 will contain some of the old piling, as the sticks were found to be sound, and as firmly imbedded in the bottom as it is possible to sink new piling at this time. However, over 4,000 new piles will be added to the new structure, heavier and larger timbers being used for the fenders, which will run the entire length of the dock. A few of the old piles when removed last fall drifted into the lake and were picked up on the beach by Chocolay farmers and taken to mill and sawed into lumber. Strange as it may seem, the lumber was as good as any pine lumber now offered for sale in the market, being clear and white and free from knots. Notwithstanding the piles have been under water for so many years, nearly everyone floated after removal and they were easily kept in boom. It is probable that the old piling will be used by the South Shore company in bridge construction on its line.

FAITH IN CAPT. MALLORY.

At a meeting of Cleveland Lodge, No. 4, of the Ship Masters' Association of the Great Lakes, held at Cleveland, O., March 16, 1906, the following resolutions were unanimously adopted:

Whereas, A fine has been imposed by the collector of customs, of Cleveland, O., upon Capt. George B. Mallory, of the steamer Amasa Stone, upon the charge that Capt. Mallory failed to stand by and render assistance to the steamer Etruria and her crew after the collision between the Stone and the Etruria on Lake Huron on June 18, 1905; and

Whereas, Such an act would in our opinion, be an impossibility to a man of Capt. Mallory's character and we believe the imposition of this fine to have been unjust, illegal and without cause; now, therefore,

Be it unanimously resolved by this association, comprising a membership of 218 masters and pilots on the great lakes, that the act of the authorities in condemning Capt. Mallory without a regular hearing; and upon insufficient information as to the facts and relation to his conduct, is a violation of the first principles of justice.

Every member of this lodge, and nearly every master on the great lakes, has known Capt. Mallory from boyhood up. He is sixty-seven years old, and has followed a sea-faring life for fifty years. Of this time he has been a master for forty-six years, always sailing the largest vessels in his fleet, and always holding the highest position of trust in the gift of the owners of that fleet. Ripe in experience, careful and conservative in judgment, and prompt in action when called upon to meet emergencies, he is generally regarded not only by vessel owners, but by his brother masters, as one of the leading men in his profession on fresh water.

But while it is hard to conceive such an officer failing in the duty of standing by a vessel in trouble, there are other and still stronger reasons why it would be impossible for anyone who knows Capt. Mallory to believe for a moment that he could be guilty of the act here charged. His character as a man is wholly at variance with such an act. He is a quiet, unassuming man, with the kindest of hearts, always thoughtful and full of sympathy; in a word, the last man in the world to turn his back upon any one in distress.

Finally, we have inquired into the facts concerning Capt. Mallory's alleged violation of duty at the time of the sinking of the Etruria, and find the charge against him to have no foundation in fact.

For these reasons, we, his brother masters, who have known him so many years as a master among masters and a man above reproach, hereby desire to place ourselves upon record as condemning the hasty and baseless action of the authorities in striking a blow at Capt. Mallory's fair name.

Be it further resolved, That certified copies of these resolutions be placed in the hands of Capt. Mallory, and the owners of his steamer, as a testimonial of our appreciation of him as a man and a sailor.

Be it further resolved, That this association tender to Capt. Mallory its offer to aid him in any way within its power, to secure a reversal of the unjust and unfounded charge of which he has been made the victim.

In witness whereof, we have executed these presents and affixed the seal of this association to triplicates hereof, this 16th day of March, A. D., 1906.

By H. T. KELLEY, President.
Attest: CARLTON GRAVES, Secretary.

APPOINTMENTS OF MASTERS AND ENGINEERS.

VANCE & JOYS CO., MANAGERS, MILWAUKEE, WIS.

Vessel	Captain.	Engineer.
Str. F. Schlesinger	E. H. Brownell	C. W. Moderson
Str. Roswell Flower	William Rosie	Daniel Darcey
Str. Frank L. Vance	D. L. Vail	C. T. Hull
Str. Maryland	Timothy Kelley	M. Conley
Str. Manchester	Everett Zwemer	James Grant

RICHELIEU & ONTARIO NAVIGATION CO., MONTREAL, CAN. C. J. SMITH, GEN. MGR.

Str. Montreal	F. X. Lafrance	G. Gendron
Str. Kingston	H. Esford	A. R. Milne
Str. Toronto	E. A. Booth Jr.	James Conlin
Str. Quebec		F. Gendron
Str. Brockville	John McGrath	J. W. Hazlett
Str. Prescott	A. Dunlop	A. Crepeau
Str. St. Irenee	Joseph Dugal	J. Hamelin
Str. Murray Bay	J. Simard	N. Beaudoin
Str. Tadousac	A. Fortin	M. Latuillippe
Str. Hamilton	C. Redfearn	B. Pintal
Str. Picton	D. F. Mills	A. DeMartigny
Str. Belleville	J. P. Stephenson	W. S. Parker
Str. Berthier	A. Robillard	E. Denis
Str. Chambly	L. Valois	E. Beaucage
Str. Cornwall	C. Lavoilette	C. Gendron
Str. Terrebonne		G. Bouret
Str. Laprarie	P. McLean	A. Gendron
Str. Longueuil	H. Mandeville	A. Noel
Str. Boucherville	J. Brossard	C. Hamel
Str. Mouche-a-Feu	F. Crepeau	J. St. Michel
Str. Varennes		
Str. Three Rivers	J. Foubert	J. Matte
Str. Beaupre	C. Gouin	F. X. Lacroix
Str. Chicoutimi		G. Gagnon

CLEVELAND CLIFFS IRON COMPANY, CLEVELAND, O.

Str. Wm. G. Mather	J. M. Johnston	Thomas Durkin
Str. Pontiac	C. R. Ney	Joseph Jamieson
Str. Frontenac	U. S. Cody	J. B. Hart
Str. Cadillac	W. H. Hoffman	W. B. Rowe
Str. Choctaw	F. D. Perew	Thomas J. Rees
Str. Andaste	James Kennedy	Bernard Henry
Str. Falcon	R. A. Gaskin	Charles Gregory
Str. Pioneer	J. A. Stewart	D. J. O'Brien
Schr. Chattanooga	M. J. Pidgeon	
Str. (now building)	S. A. Lyons	C. H. Menmuir
Str. (now building)	H. H. Parsons	E. I. Jenkins
Str. (now building)	C. E. Sayre	John McMonagle

CLEVELAND CLIFFS IRON COMPANY, CLEVELAND, O. MANAGERS FOR THE PRESQUE ISLE TRANSPORTATION CO.

Str. Peter White	S. N. Murphy	E. V. Barry
Str. Presque Isle	H. W. Stone	Wm. Naylon
Str. Angeline	T. E. Murray	George M. Wise

CLEVELAND CLIFFS IRON CO., CLEVELAND, O. MANAGERS FOR HOPKINS STEAMSHIP CO.

Str. Centurion	C. A. Anderson	A. G. Bohland

CAPT. J. B. LOZEN, NEW BALTIMORE, MD.

Str. C. A. Street	J. T. Hanson	Charles Flanaghan
Bge. J. B. Lozen	J. F. Lozen	
Bge. J. Godfry	Richard Moore	

MUTUAL TRANSIT CO., BUFFALO, N. Y.

Str. Northern King	E. C. Leath	A. Nagelvoort
Str. Northern Queen	W. H. Stevenson	P. J. McGinnis
Str. Northern Wave	D. L. Cartwright	J. J. Darcy
Str. Northern Light	S. B. Worden	John Dee
Str. North Star	George Hayward	W. T. Pike
Str. North Wind	E. B. Blair	T. Jackman

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JOHN W. ROBINSON, NORTH TONAWANDA, N. Y.

Str. C. H. Green	C. E. Little	Wm. Ormsby
Bge. Genoa	D. C. Ryan	
Bge. Our Son	M. Ryan	

LEATHAM & SMITH TOWING & WRECKING CO., STURGEON BAY, WIS.

Str. C. B. Packard	Charles B. Packard	James Curry
Str. Jos. L. Hurd	James Keenan	Edward Webber
Tug A. J. Wright	Henry Trefts	Frank Larsen
Tug John Leathem	T. C. Ewing	Charles Cotterfield
Bge. M. Doherty	Tom Talliffson	
Bge. Portolapidem	W. Talliffson	

CHARLES H. ELLIS, MANAGING OWNER, MILWAUKEE, WIS.

Str. Hilton	Manning Kilton	John Sanville

ARGO STEAMSHIP CO., CLEVELAND, O. E. L. FISHER, MNGR.

Str. Argo	George L. Cottrell	
Bge. Dobbins	Harry May	
Bge. Jones	John Nelson	

CANADIAN LAKE & OCEAN NAVIGATION CO., TORONTO, CANADA.

Str. Turret Court	Peter McIntyre	C. J. McSorley
Str. Turret Chief	Malcolm McPhee	A. E. Kennedy
Str. Turret Cape	Archie McIntyre	W. H. Durham
Str. A. E. Ames	E. L. Stephen	S. Gillespie
Str. J. H. Plumer	James Black	Robert Chalmers
Str. H. M. Pellatt	W. H. Anderson	Wm. Byers
Str. Scottish Hero	Not yet appointed	Robert Duguid

FRANK. W. SMITH, MILWAUKEE, WIS.

Str. E. M. Peck	A. C. Callam	Harry Stokke
Str. Omaha	Frank Brown	R. Elhammer
Str. Pueblo	T. W. Lawler	Wm. Risch
Str. Mary H. Boyce	J. D. Wanwig	

LAKE MICHIGAN CAR FERRY TRANS. CO., SOUTH CHICAGO, ILL. (CONTROLLED BY WISCONSIN & MICHIGAN RY. CO.)

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Str. J. C. Ames	W. H. Welcher	Jay G. Phillips
Transport One	Alex. Bohlin	
Transport Two	Chris. Olsen	

W. E. DONELY, SAGINAW, MICH.

Bge. Katie Brainard	Wm. Haggerty	

CANADIAN PACIFIC RAILWAY CO., OWEN SOUND, ONT.

Str. Manitoba	E. B. Anderson	W. Lewis
Str. Athabasca	George McDougall	W. Lockerbee
Str. Alberta	L. Pyette	A. Cameron

F. W. GILCHRIST, ALPENA, MICH.

Str. Viking	Harry Richardson	John Barr
Str. S. C. Hall	John Place	Charles Miller
Bge. Sam Flint	Alex. McLean	

CHARLES BEYSCHLAG, ST. CLAIR, MICH.

Str. America	Henry Leisk	George H. Bowen

GEORGE NESTOR, DETROIT, MICH.

Str. Schoolcraft	Joseph Bourassa	
Schr. Mary Bourke	Phil Heppner	
Schr. Geo. Nester	George DuBeau	
Schr. Keweenaw	George Richie	

COMSTOCK & SINCLAIR, DULUTH, MINN.

Str. O. T. Flint	John Randal	Robert Cameron
Str. Simon Langell	Guy Geel	George W. Cook
Schr. Arenac	W. Powers	
Schr. W. K. Moore	Burt Warwick	
Schr. Interlaken	Robert Taylor	

WM. SCHLOSSER, MILWAUKEE, WIS.

Schr. City Sheboygan	Peter Peterson	
Schr. Minerva	Hans Peterson	
Schr. Levi Grant	Nels G. Norem	

W. H. BECKER, MNGR, ROBBINS TRANS CO, CLEVELAND, O.

Str. Francis Robbins	F. B. Chilson	James Connars

W. H. BECKER, MNGR., THE VALLEY TRANSIT CO., CLEVELAND, O.

Str. Wm. G. Pollock	H. G. Haybarger	Ed. Reiley
Str. Joshua Rhodes	Thomas Simmons	James Norton

W. H. BECKER, MNGR., INTERSTATE STEAMSHIP CO., CLEVELAND, OHIO.

Str. B. F. Jones	Claude Ennes	George Oldman
Str. James Laughlin	George A. Symes	Wm. Millington

S-W TRANS. CO., CLEVELAND, O. CHARLES T. WILLIAMS, MNGR.

Str. A. G. Lindsay	C. H. Woodford	John Duchene

L. C. WALDO, MNGR., ROBY TRANS. CO., DETROIT, MICH.

Str. L. C. Waldo	John Duddleson	N. E. Allen

W. H. BECKER, MNGR., COLUMBIA STEAMSHIP CO., CLEVELAND, O.

Str. Francis Widlar	Henry Hinslea	George Allen

SHOAL WATER TRANSPORTATION CO., MT. CLEMENS, MICH.

Str. Norwalk	Frank Goodrow	Joseph Bador

SANDUSKY & ISLANDS AND SANDUSKY & PENINSULAR STEAMSHIP CO., SANDUSKY, O. E. M MCFALL, MANAGER.

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Str. Lakeside	Jay C. Fox	Wm. Quick

D. SULLIVAN MNGR., GREAT LAKES & ST. LAWRENCE TRANS. CO., CHICAGO, ILL.

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Str. H. C. Dalton	Joseph Rinn	Guy L. Barnhart
Str. A. D. Davidson	H. J. Hagan	Wm. Norcross
Str. George C. Howe	Frank C. Pratt	R. W. Hunter
Str. J. S. Keefe	Dan Barry	George Winters
Str. John Lambert	D. T. Sullivan	John McCaffrey
Str. A. M. Marshall	John A. Duncanson	A. W. Scott
Str. S. N. Parent	George E. Talbot	C. T. Kidd
Str. John Sharples	Frank L. Meno	Wm. Newcomb
Str. Robert Wallace	Ralph Gleason	George E. Willard

MICHIGAN CENTRAL R. R. CO., DETROIT, MICH.

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Str. Transfer	John Craig George Horn	Arthur Barton
Str. Transport	Wm. King	John Cockburn
Str. Detroit	H. L. Innes A. J. Huntoon	D. A. Black

L. C. WALDO, MNGR., NORTHWESTERN TRANS. CO., DETROIT, MICH.

Str. Harvey Brown	D. Girardin	Nicklas Anderson
Str. Fayette Brown	D. Girardin Jr.	Robert E. Cummings.
Str. S. R. Kirby	T. H. Sanders	
Bge. Geo. E. Hartnell	Walter Girardin	

ROBERT DOWNEY & CO., OSWEGO, N. Y.

Str. Monteagle	Theodore J. Carlisle	Wm. S. Brown

GRAY TRANSPORTATION CO., CLEVELAND, O.

Str. Arizona	W. R. Neal	Michael Walsh
Schr. Scotia	Charles Jorgenson	
Schr. Plymouth	Archie Thompson	

KELLEY ISLAND LIME & TRANSPORT CO., CLEVELAND, O.

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Str. Albert Y. Cowen	C. Smith	D. Manns
Tug W. B. Sanders	John H. Wysoon	John O'Connor
Str. Edward L. Rector	Edward Geisendorfer	Louis F. Miller
Str. Clinton	John Steible	Robert Burke
Bge. Norman Kelley	A. Brant	
Bge. J. H. Pellett	W. Kelley	
Bge. David Moran	J. M. Robinson	

W. S. BRAINARD, TOLEDO, O.

Str. Cherokee	James Mara	J. S. Robertson
Schr. Chippewa	John Davidson	

TURBINE STEAMSHIP CO., HAMILTON, ONT.

Str. Turbinia	B. W. Bongard	W. A. White

EDWARD MEHL, ERIE, PA.

Str. Uganda	W. W. Wilkins	Charles R. Ogg

M. H. TAYLOR, ERIE, PA.

Str. Niagara	M. A. Budd	A. Turner

OGDENSBURG COAL & TOWING CO., OGDENSBURG, N. Y.

Str. Nicaragua	James Owen	Freeman Axtell
Str. Avon	Geo. P. Clifford	D. G. Costello
Tug George D. Seymour	P. J. McGrath	Thomas O'Neil
Tug Megra	James Martin	Frank Norris
Bge. Henry Witbeck	J. Mallett Sr.	
Bge. Fred Carney	Timothy Hunt	
Bge. Hoboken	Adelon Demars	
Bge. Menominee	J. Mallett Jr.	
Bge. James Buckly	A. Derocher	
Bge. H. B.	Alfred Lalonde	

The navy department has approved the survey authorizing $66,000 for the repair of the monitor Wyoming now at the Mare Island navy yard.

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IMPROVEMENT OF OUR WATERWAYS.*

BY CONGRESSMAN JOSEPH RANSDELL.

Cheap transportation is the greatest problem of the commercial world, and the nation which solves it best and quickest is bound to win in the race for commerce supremacy if other things are equal. Water transportation is from three to ten times as cheap as rail, and it should be developed to the utmost both as a carrier of freights and a regulator of rates. Wherever we have rivers, canals and lakes, with good navigation, freights are cheap and there is no demand for rate legislation. The widest piece of statesmanship ever devised and carried out by a state of the union was the Erie canal. It made New York city the metropolis of the nation, and has given to the whole state an impetus that will never be overtaken. Next to the wisdom of the original enterprise, on which $50,000,000 has been spent, is the present great enlargement of this canal at a cost of $101,000,000 additional. When it is completed New York will have spent on the Erie canal $157,000,000 and as the United States in its whole history has spent on river and harbor improvement only $470,000,000 it appears that New York is far more advanced in this respect that the nation, for its expenditure on this canal alone is fully one-third that of the nation on all its waterways. Would to heaven the national legislators would adopt the wise and far-sighted policy of the statesmen of New York in this respect.

No wiser nor more generally beneficial expenditures are made by congress than those for improving the waterways and thereby cheapening freights to every citizen of the union, and yet people talk about river and harbor steals, and pork barrel bills. These are slanders out of the whole cloth. I do not speak of the entire legislation of the past on this subject. There may possibly have been a few improper things in years long ago just as you have had recent insurance scandals which should not discredit the merit and beneficence of the insurance system. But I do say that during the five years that I have served on the rivers and harbors committee of congress two bills have been adopted carrying about $100,000,000, in the aggregate divided among several hundred projects, and if one cent thereof was unworthy, I do not know it. Every project was first surveyed with great care and approved by the United States engineers—as honorable body of men as there is on earth—and unless the resultant benefit was commensurate with the cost we made no appropriations. Should these slanders be repeated, I beg you to call for specifications and send them to me.

For some cause, which I cannot understand, sentiment among the leaders in congress has not been very favorable to waterways improvement. For the past ten years rivers and harbors bills have been adopted every three years instead of annually, as other great appropriations, and have averaged only $19,251,000 a year, as compared with $66,958,000 for the navy, $69,704,000 for the army, $127,603,000 for the postoffice and $143,242,000 for pensions.

During these ten years the average appropriations for all purposes of government have been $712,000,000 a year, and of this sum rivers and harbors have received less than 3 per cent, while other expenditures made in the interest of commerce, such as lighthouses, custom houses, and the consular service, etc., get about 1 per cent, making a total expenditure for commerce of about 4 per cent. How does this compare with the army, the navy, and pensions—war and its rewards—$280,000,000 a year—over 40 per cent of the whole—commerce getting 4 per cent, just ten times as much. And we are not considered a warlike people. I do not criticize the army and navy, and certainly have kind words and kind thoughts for the gallant veterans of our wars, but surely this is not fair play. Our commercial interests are not getting a "square deal." They must rise up in their might and demand it. Practically all our revenues come from commerce. Our spendid commerce makes us the wonder of the world and annually pours into our lap a balance of trade in our favor of half a billion dollars a year. Such a commerce is entitled to proper and just recognition at the hands of the government and must receive it.

We must not let our French and German neighbors lead us too far. They are away ahead of us now in the development of their waterways. Rivers have been deepened and canals have been constructed all over France and Germany at a very great cost and it is said that freight can be conveyed from any part of these countries to every other part by water at a minimum freight charge. Let us emulate their good example.

Our present appropriations are entirely inadequate and at the existing ratio it will take over thirty years to complete the projects now on hand which have received the approval of the engineer department. Let me cite your own Harlem river for example. Your project for 15 ft. deep 400 ft. wide and 8 miles long, from East river to the Hudson, at an estimated cost of $2,700,000, was adopted in 1878 twenty-eight years ago. On this work $1,320,000 has been spent and the amount needed to complete is $1,380,000. It has taken twenty-eight years to finish one-half of it. The last two bills of 1902 and 1905 each carried for $75,000 or an average of $25,000 a year. At this rate it will take fifty years in addition to the twenty-eight that have already elapsed, and yet your project is one of the most worthy in the nation. In 1895 your commerce was 7,533,595 tons, valued at $203,707,376 and in 1904 it was 9,130,763 tons valued at $231,385,204. And I wish to say it was no fault of your very efficient congressman Mr. Goulden that you did not get more. He was untiring in his efforts not only for the Harlem, but also in securing a survey of the Bronx-Kills and $24,000 for the Bronx river. You got your full share of what was going, and there will not be enough until public opinion demands a change. Your project is but a sample of many others in the union. It is worthy in every respect and should be completed at once, just as a great many others are worthy of speedy completion, but at the present rate it will be fifty years before it is finished. If you desire its prompt completion, I appeal to you to join the National Rivers and Harbors Association, and help us to arouse sentiment in favor of a change of policy.

The friends of the waterway improvement in the United States must get together. We must organize into a compact and solid body, and have as our slogan a broad and liberal policy in waterway improvement; river and harbor bills on a par with army and navy bills; river and harbor bills every year, and river and harbor bills carrying at least $50,000,000 a year until all our waterways have been improved. The National Rivers and Harbors Association is such a body.

This is an age of combination or union, and as chairman of the executive committee of the national rivers and harbors congress, it is my duty to form a union of every one in this nation interested in waterway improvement, and to create an organized movement to present our claims to congress and insist upon proper recognition of every meritorious waterway project in the land. Let us all unite and pull together for the good cause, and soon our waterways will be better developed than those of France and Germany and the rate question will be forgotten.

* Address before the North Side Board of Trade, New York.

The steamboats of the Pittsburg & Morgantown Packet Co. have been sold by the United States marshal in Pittsburg. O. C. Burtwin of the Marine National Bank bid in the steamer Columbia for $19,225. The others were purchased by the Monongahela River Consolidated Coal & Coke Co.

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MERCHANT MARINE LEAGUE.

Today (Thursday) the shipping bill comes up before the committee on merchant marine and fisheries of the house of representatives from which body it is to be reported to the house. Mr. Harvey D. Goulder, president of the Merchant Marine League of the United States, has been in Washington during the past week urging favorable action upon the bill and he is seconded by representatives of the manufacturing and financial interests of the country. At no time in the history of shipping legislation has there been so unanimous a sentiment in favor of government aid to shipping as now.

Mr. Goulder has just sent the following communication to the *Journal of Commerce* of New York in answer to an editorial which it recently printed:

The editorial in your eesteemed issue of the 12th, on the subject of "'Pressure' for the Subsidy Bill," is before me, and I trust you will pardon the suggestion that it scarcely conforms to the customary fairness and frankness of your newspaper in dealing with the Merchant Marine League of the United States. I can scarcely believe that, even under the apprehension you seem to feel over the possible passage of the shipping bill, you would intentionally misstate matters regarding the league and its work. Relying, therefore, upon your disposition to be fair and just, may I ask what justification you have for asserting that the league "has been engaged for months in the attempt to manufacture public opinion in favor of ship subsidies," and how you happen to know that we are "recognizing that there was none of that commodity in stock"? And as to our "literature" which you characterize as "enticing and delusive," will you not be more specific as to the latter epithet?

In the first place, we realize that there is a very general and widespread demand for an American merchant marine, and it is scarcely conceivable that a journal of your own perspicacity, so keenly looking for every manifestation of this kind, should have failed to find an abundance of it. This league is not engaging in the manufacture of any sentiment, but it is diligently at work securing an expression of such sentiment as does exist. There being so much of it, naturally it keeps us very busy, and the literature that we are distributing is largely composed of giving wider publicity to such expressions, and in correcting the very many, and in a number of cases indefensible, misstatements that are published in the opposition press.

If there is so little "fructification" resulting from the efforts of the friends of American shipping, why such manifestation of fright on the part of the opposition?

Since you seem to be so well informed as to where the "envoys of the subsidy hunters are converging" possibly you are equally as well informed as to where the enemies of subsidies are converging? Who they are, what they represent, and what they are doing, if you would tell—if you know—would be extremely interesting. Even our league might be disposed to reproduce, and widely distribute, a fair exposure of the men, whom they represent, and what they are doing, who are opposing the shipping bill, if you will with perfect candor tell all that you know on that point. We therefore urge in fairness that you give as much publicity to the efforts of the enemies, and make plain who they are, that are opposing the bill.

We have previously informed you, and we now reiterate, that the work of the Merchant Marine League is a wholly patriotic work, that it is a public-spirited work, and that, so far as the officers and a large majority of the members of the league are concerned, it is an unselfish work, as they have no financial or personal interest in the success or failure of the bill.

We are doing our work openly, publicly, honestly, and we say to you in all sincerity and honesty that it does not emanate from the ship building and ship owning interest in this country. On the contrary, it arises in precisely the manner that we have above explained.

Since you have so grossly and unjustly misstated our position, therefore, we trust that you will with a fair degree of conspicuousness, give publicity to this letter.

In conclusion we beg to ask if you are aware that the foreign shipping interests, so well and ably represented in this country, so dominant in our foreign carrying, and so conspicuous as advertisers in the columns of your esteemed newspaper, are manifesting any interest whatever in the outcome of this pending shipping bill? Do you know that they, or any of them, are opposing it, or inciting opposition to it? If you do not know, are you in the way of finding out, and will you, and give publicity to your findings? And if you will not do that, will you state whether it is or is not your opinion that they—the foreign shipping interests in this country, and their representatives and friends—would like to see this bill, which seeks to build up an American merchant marine in the foreign trade, defeated?

Speaking solely for the league, we desire to utterly and absolutely deny this statement in your editorial:

"As usual there is no organization working to make the pressure of those felt who will have to foot the bills and will have no share in the benefits."

The league, as we say, is working patriotically and unselfishly for the promotion of American shipping, and it is footing all its own bills. Moreover, we have never received a dollar's contribution to our work save that realized from membership dues, and that contributed by a group of people in this city of Cleveland not one of whom has a dollar's personal interest in any of the existing or prospective ships that would benefit by the passage of the shipping bill.

HARVEY D. GOULDER, President.

A SEA CAPTAIN INVENTOR.

Capt. R. T. Lawless, of the Oceanic Steamship Mariposa, who recently patented a stellar compass that has attained to some prominence among ships of the navy and in the merchant marine, has also invented a planisphere. For the past two years Capt. Lawless has been studying over this latest device, and only since arriving at San Francisco on his last trip from Tahiti, has he completed his work. The planisphere is intended for the use of navigators only, and shows how to locate the stars for meridian altitude or longitude. Like his former invention, the stellar compass, the planisphere promises to be not only a valuable guide to navigators, but a source of some profit to Capt. Lawless.

PERSONAL.

In uniformity with an understanding with the president of the American bureau of shipping, Mr. E. Platt Stratton desires to give notice that his services as the chief engineer surveyor of the bureau will terminate July 1 next.

Capt. Cyrus H. Sinclair has returned from a trip to eastern cities where he exhibited his model of the new Brown automatic indicator which registers on a dial in the pilot house every movement of the throttle in the engine room. This device will be installed on a number of lake steamers.

Mr. E. L. McAllaster and Mr. Samuel Bennett announce that they have formed a partnership for the more efficient handling of their business under the firm name of McAllaster & Bennett. They are consulting and constructing engineers and naval architects with offices at 503-504 Pioneer building, Seattle, Wash.

The keel for the new six-masted wooden schooner has been laid in the yard of Percy & Small, Bath, Me.

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SCIENTIFIC LAKE NAVIGATION.

Mr. Clarence E. Long, who will begin a course of instructions in scientific lake navigation in the MARINE REVIEW April 5, was born at Sturgeon Bay, Wis., Oct. 6, 1873. He is the son of Frank Long, editor and proprietor of *The Advocate*. He attended the public schools of his native town till he was 13 years of age, and then entered the printing establishment of his father. The balance of education was gathered through his own efforts—studying and learning by self-instruction. He became interested in lake marine affairs at an early age and when 17 years old started the study of navigation and wrote marine for the columns of *The Advocate*, soon making this paper, what sailors all say "the best little marine paper in the Green bay region."

MR. CLARENCE E. LONG.

In 1896 Mr. Long took up the work of compass adjustment in a small way, and the following winter started the Sturgeon Bay Nautical School. This became very popular and in the winter of 1901 it was moved to Milwaukee. At Milwaukee Mr. Long had a large number of scholars and prepared several of them for sea-going licenses, they having no trouble in passing the examinations on the sea-coasts. From his long experience in the school-room Mr. Long discovered that the greatest need of the majority of lake marine men was a simple and easily learned book on the science of practical lake navigation, all existing publications of this sort being so complicated and technical as to prove beyond the average person. His varied experiences as compass adjuster and special navigator on every class of lake tonnage afloat—from the 30-foot sail yacht to the largest freighter—made this all the more apparent. It then became his ambition to write such a book and have it published for the benefit and advancement of the lake mariner. As publishing such a book meant the outlay of considerable money, he was unable to undertake the project until the winter of 1904-5 when the *Nautical Magazine* appeared. This magazine was devoted to the science and practice of lake and coast navigation by self-instruction, and was so clearly and simply gotten up as to be readily understood by everyone. It consisted of twelve monthly installments or lessons, and explanations, the whole making a simple but complete book on the art of lake navigation from a scientific standpoint. The book met with good success, the author receiving many complimentary letters from persons high up in the profession.

Mr. Long is a self-made man and his exceptionally good success as a teacher of navigation he attributes to the fact that what knowledge he possesses of the subject was obtained without the aid of tutor; to do this required a great amount of study and perseverance. What he learned he worked hard for, and when one gains knowledge under such conditions and circumstances it is real knowledge. He was not satisfied merely to learn the theoretical side of the subject, but he put all the theory he learned into practice. Being thus situated he is naturally adapted to impart this knowledge to others and to clear the way of obstacles that proved stumbling blocks to him.

Mr. Long is an ardent supporter of the building of a new merchant marine on the high seas and for laws to create and protect same; for stricter steamboat inspection laws on the lakes, thus giving better boats and more efficient officers on them; and of all such other reforms as would tend to upbuild the lake marine.

There are many excellent works on navigation, but they apply to deep-sea navigation. Many of these are simple and easily understood by one who has had some ground-work in the science, but the majority of them are not. If they do exist they are scattered through so many pages, and so smothered by their surroundings, as to require too much digging out—too many shells to be cracked before arriving at the kernel—a tedious process from which the practical mind recoils, let alone the tyro who would be at a loss to even know where to make a start. Mr. Long realized this, and particularly so from his own experiences, and this was one of the material reasons for his preparing this special study. Prior to the issuing of his *Nautical Magazine* there did not exist a simple, yet comprehensive work, founded on correct principles and expressed in homely language for the lake mariner, whereby he might quickly develop his position under the peculiar and particular conditions in which he so often finds himself. His entire course of study is treated from the standpoint that the lake mariner knows nothing even of the first principles of the science.

There is just as much need for the navigator here on the lakes as on salt water, so far as applicable to the compass, if not more so, since on the ocean there is more sea room and the position is verified by astronomical observations.

The last issue of the *Nautical Magazine*, published by Clarence E. Long, is out, and is now being mailed to subscribers. This completes the object sought by its author—to furnish the lake mariner with a book of navigation instruction adaptable to his actual needs. It has taken Mr. Long about a year and a half to get this book out—doing nearly all of the mechanical work himself. This is probably the only navigation work ever put in print where the author was his own typesetter and printer.

The *Nautical Magazine* and its principles of navigation has been most favorably greeted by the lake marine in general and approved by its best men. It has been endorsed

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by naval men, nautical experts, compass adjusters, teachers of navigation, steamboat inspectors, and others, as being the most simple and exhaustive treatise on navigation of its kind yet published. It also has the distinction of being the first of its kind put into print.

While this is the last issue of the *Magazine,* it is by no means the last of Mr. Long's navigation work. He has much more in preparation for future publication. Mr. Long wants it known that his work in this special line has only begun, and that there is much to follow. The twelve numbers of the *Magazine* make nearly 500 pages of instruction. Mr. Long has a large number of each edition of the *Magazine* which will be placed in book form on the market. In the very near future Mr. Long will publish a set of questions with detailed explanations, for each of the *Magazine* lessons, which will further increase the efficiency of the instruction so far published.

This Question and Answer department is for the benefit of the reader, and its success will depend entirely upon his co-operation and display of interest. Therefore, Mr. Long asks the support and confidence of everyone connected with the lake marine, yachtsmen and others. The REVIEW has no other motive than to stimulate the lake mariner to take an increased interest in his work, and to awaken in him the realization that to succeed in any vocation, nowadays, one has to know the "why" as well as the "how." To do this requires study and perserverance. There is always a chance for the right man.

Do not be afraid to ask questions. This department is for that purpose and it is meant to be taken advantage of. There are so many men who lack the courage of coming out openly and boldly in discussing these matters, matters that have to do with their every day practice in navigating the lakes. It should not be looked upon in such a light. Remember that it is not the questioner that is benefited by this information but hundreds of others similarly situated. At no time in lake history has such a quick, keen and intelligent interest been manifested in scientific lake navigation as at present.

Each issue of the MARINE REVIEW will contain a portion of a complete lesson of this Self-Taught Lake Navigation Course. This course is a thorough treatise on both the theoretical and practical sides of the art of successful scientific lake navigation, and is intended especially for the lake mariner—no matter what berth he is filling on board—from deckhand to master. Just the thing for the beginner, the amateur boatsman and yachtsman. This course of self-instruction has been prepared for this special purpose. The course is complete in every detail, and much time and labor has been spent in making it of inestimable value to the student.

The MARINE REVIEW'S navigation course contains only that which is of real and practical value to the beginner, the seaman, and the practical navigator alike, who desire to learn and become proficient in the science. Everything is explained in a simple way and in simple language, and can be readily understood by the ordinary sailor whose education may be limited.

The various subjects comprising this course have been treated from the standpoint that the student has no other education than the ability to read and write, and to cipher to the extent of the four fundamental principles of arithmetic, and he is led step by step, from the first operations in the arithmetic of navigation to the finding and tabulating the deviation of the compass, its adjustment, the correction and conversion of courses upon which the safety of the vessel depends, and in fact, the entire navigation of any vessel.

The need of a simple and yet comprehensive course of study by self-instruction on the art of navigating a ship on the great lakes according to scientific principles is what led Mr. Long to undertake the preparation of this course, and for the same reasons, it is the REVIEW'S desire to publish these instructions for the interest and benefit of its readers. Simplicity and clearness are manifest throughout the work, and its aim is to instruct the beginner, leading him from the first operations to the perfection of the art as found in any standard work on navigation. The instructions have been made as clear as they possibly could and in minute detail, especially the little things to which so many writers pay no attention, but which are really the stepping stones to successful learning and so indispensable to the beginner.

This navigation course is intended to lead pupils to acquire a knowledge of navigation by means of theoretical and practical explanations and experiments. It seeks to bring directly under the pupil's observation the reality itself, thus training him to observe for himself, to think for himself and to think correctly. Do not think because you are the master of a vessel that this course of instructions can be of no benefit to you. It is intended as much for you as for one without an inkling of navigation. Begin at the beginning and do not imagine that because you are a master or mate that you are beyond the first lessons of this course, and that all you need is azimuth work and compass adjustment. You must understand first the principles underlying those subjects, and in order to thoroughly understand them you must begin at the beginning and learn everything thoroughly that is given. Follow this advice and you will be surprised at the progress you will be able to make, and it will be real progress. On the other hand if you skip about, learning a little here and a little there, you will soon become discouraged at the slow progress you are making, and you will be unable to connect correctly the various subjects studied, since you will not understand their application. The first essential to the learning of navigation is to be thoroughly familiar with the "Arithmetic of the Compass," that is, to know all about the degrees, minutes and seconds into which the compass card is divided, how measured, and the principles upon which based. Arithmetic of the compass is practically the foundation of navigation, and is essential to a thorough understanding of same. This is just where many practical men make their mistake in taking up the study of navigation, in not learning the first principles of the science.

Men who have tried to learn navigation from standard works which are addressed to navigators only, and others to mathematicians, will, it is hoped, appreciate this course of study.

The science of navigation, as a branch of mathematics, is independent of all practical experience on the lakes, or anywhere else, which experience avails nothing in the practical solution of problems pertaining to compass, log-lead and chart, and dealing with courses and distances.

Wideawake sailors today believe in the common-sense course of spending a portion of the dog-watch in self-improvement—getting to windward, as it were. The man who does not study these days remains at a standstill, and gradually drifts on a lee shore, a position from which he is unable to tack ship.

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LIVERPOOL SHIPPING LETTER.

Liverpool, March 12.—Lord Inverclyde, speaking at the annual dinner of the Scottish staff of Lloyds Register in Glasgow, said the tonnage holding the classification of the society, now amounted to 9,744 vessels of 18,250,000 tons, a net increase of 553,000 tons in the twelve months. The total comprised over 71½ per cent of the steam tonnage, and nearly 94 per cent of the sailing tonnage of the united kingdom, excluding vessels under 100 tons. In the progress of Lloyds it was satisfactory to know that the Clyde was still leading. There were at present building in the district 129 vessels for Lloyds classification, while on the Tyne there were 61, on the Wear 42, and on the Tees 41. Speaking of the new Cunarder Carmania, he said she was the largest vessel yet built for turbines, and she was much more of a departure than the two big liners would be. They were not such a step in advance of the Carmania, as she was in advance of everything previously in existence.

Prof. Harvard Biles in the fourth of the series of Keith lectures last week, described fully the method of obtaining the blade areas, and the method of obtaining the revolutions necessary to drive such propellers to obtain required horsepower. He showed in a set of propellers of the type experimented upon by Mr. Froude in the admiralty tank at Haslar that the efficiency fell off with decrease of diameter and increase of pitch ratio, and that increase of pitch ratio reduced the revolutions very rapidly. In a 22-knot steamer, having three propellers, each requiring a thrust of 15 tons to drive the vessel, an 8-ft. diameter propeller with pitch ratio of 1, 1.5 and 2 would have efficiencies, he said, varying not more than 2 per cent at revolutions ranging from 360 in the higher to 220 in the lower pitch ratio, while the same type of propeller 7 ft. diameter would have a variation in efficiencies of 5 per cent, the revolutions for the corresponding pitch ratios being 450, 340 and 290. This type of propeller was one with constant ratio of area to disc; but more recent experiments than Mr. Froude had published, made in the Washington experimental tank, had enabled naval architects to determine the effect of large changes in blade area of propellers. These experiments were made upon models 16 inches in diameter, so that they were not in any sense toys, but were one-fourth of the full size of propellers such as those fitted in the Londonderry, the Queen and the Amethyst. The field of exploration of variations in diameter, pitch, revolutions, and blade areas seemed now fairly complete. The wide range of this experimental work enabled investigators to conclude that within working limits propeller forces varied as the square of the speed of advance—that was the speed of the ship—so that experimental results at one speed were all that was necessary to enable those at other speeds to be determined. The results of these experiments, could, therefore, be standardized, and the general tendency of the various changes seen. One important element in a propeller was its capability of absorbing and giving off efficiently the power of the motor which drove it. The experiments showed that for similar propellers this power rapidly increased with decrease of pitch ratio; that with small pitch ratios the narrow blades absorbed a little more power at low slips than the wide blades up to a certain point; after which, as the slip increased, the wide blades gradually absorbed greater power than the narrow ones. For large pitch ratios the wide blades absorbed slightly more power at all slips. Maximum efficiency occurred at lower slips as the pitch and area ratios decreased. The value of the maximum efficiency increased as pitch ratio increased for the smaller area ratios up to 1.2 but slightly decreased afterwards. In the larger area ratio, however, it continuously increased with increase of pitch ratio. The value of maximum efficiency increased between the area ratios 0.075 and 0.125, but decreased with further increase. The results showed the somewhat erratic course of efficiency. A large number of examples were given of the application to special cases of these results, the most interesting being those corresponding to a channel steamer of 9,000 H. P. and an Atlantic liner of 24,000 H. P. and a 26-knot vessel having four propellers each of 20,000 H. P. Similar curves were shown for the same total horsepower, but divided in each case between two propellers only. It was shown that the efficiency of propeller increased with diameter and decrease of revolutions, and that the turbine efficiency increased with increase of revolutions and decrease of diameter of drum. Combining these two tendencies or efficiencies it was shown that in some existing cases better efficiency would be obtained by larger turbines and smaller revolutions, but that a limit was placed to this increase of size of turbine by the greater weight and the greater losses of the larger turbine, though it appeared that the maximum efficiency of the combination corresponded to a slightly larger turbine than had been generally adopted. Instances were given of halving the revolutions and doubling the diameter, showing a considerable change of efficiency. With reference to the matter of the practical economy of the turbine as applied to marine purposes there was still a great deal of conflict of evidence. Several instances were given, and it was stated that there were very few cases in which a direct comparison under exactly similar circumstances could be made. The closest comparisons were those of the Midland Railway Co.'s boats designed by himself, as these were running on the same service, and were exactly of the same form. The comparative results on service were not so favorable to the turbine as those on trial. At first sight it might appear that the extra resistance met with at sea as compared with that on trial caused the large propellers of the twin screw vessel to be relatively more efficient than the small propellers of the turbine vessel. But from results of observation of revolutions extending over long periods, it was shown that while the twin screw vessel had a ratio of resistance at sea to that on trial of about 1 to 1.25 the same test in the turbine vessel made the ratios as much as 1 to 2.25. As the sea did not discriminate between a turbine and a twin screw vessel in the manner of resistance offered, it seemed evident that the propellers of the turbine vessel were not delivering a thrust due to their revolutions and size, and that in order to maintain the efficiency that the turbine showed on trial, it would be necessary in future vessels to modify the relation of the turbine and the propeller to ensure the best results at sea. It seemed that efficiency on trial had been attained at the expense of efficiency in service, and that the full advantage obtainable in the economy of the turbine had not yet been attained in sea-going results.

The Glasgow correspondent of the *Shipping Gazette*, says Britain cannot, of course, come within measurable distance of the loading and discharging exploits that are credited to the vessels that navigate the great lakes of North America, but she can in her own little way do a smart thing now and again. The Dublin coaster St. Kevin took on board on Friday, March 2, in the Queen's dock, 700 tons of coal in three hours. Then she sailed for Dublin, discharged her cargo, went across to a Welsh port, took on board a cargo of limestone, and was back with this at Glasgow on Tuesday, 4 days later. To put on board 700 tons of coal in three hours was nothing for the coal cranes. They could have done more if they were allowed to tip over truck after truck. The delay in loading steamers not specially designed for such cargoes is caused by the "trimming" in the hold falling behind. On the big American carriers the deck is practically one continuous hatchway, and trucks—three or four times as large as ours—can be tipped into any part of the hold without any trimming being necessary.

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It is no secret that the success of the Parsons steam turbine has brought rivals into the field, notably in America and Germany, and it is now reported another marine turbine engine has been patented, and is being subjected to experiment on Tyneside. This patent is said to be the work of two Tyneside engineers, and to have this advantage over the Parsons turbine—that it is reversible. The experiments are, so it is said, being conducted by the Palmer Ship Building Co. at Jarrow, which company may adopt the new turbine if it justifies their expectations. With an assured future before the marine steam turbine, a development of this nature is calculated to excite particular interest in the engineering world, and if it has the advantage claimed for it, the new patent might very easily meet with immediate success in the way of practical adoption.

The popularity of the turbine for passenger boats is very emphatically demonstrated by the decision of the admiralty to supply King Edward's new yacht with the new system of propulsion.

PROGRESS WITH THE MARINE TURBINE.

Almost every month that passes brings some addition to the literature in connection with the development of the steam turbine. The subject has been a most popular one, both for authors and those who join in discussions at the meetings of the various technical societies. It must be confessed that in many cases there is a great deal of repetition. During the last few months we have had more than one text book dealing in a more or less similar fashion with the evolution of the various types of steam turbine. The greater part of these works are filled with data, and records, chiefly of interest to the designers of turbines used in connection with land plants. They are of interest and service also to those who may be placed in charge of such plants. Such works will probably become recognized authorities in due course, but for anything really new and stimulating we must rely upon the literature which issues from the various engineering societies. A paper recently presented to the Liverpool Engineering Society deals in a most interesting manner with the application of the Parsons turbine to marine propulsion. It is not, of course, the first paper of this sort that has been read, nor does it contain everything of an entirely original nature, but there are one or two facts brought to light which are well worth notice. First of all we are glad to be reminded that the first compound steam turbine built only twenty-five years ago, and developing a modest 10 H. P., after performing a great deal of useful work for electric lighting purposes, is now safely housed in the South Kensington museum. Then we are glad to observe, as the latest estimate, that the total horsepower of Parsons turbines delivered and on order is about 1,500,000, and that some of the units ordered are upwards of 10,000 H. P. It is also worthy of record that just as the success of the turbine on land was rendered possible by the unremitting devotion of Mr. Parsons to problems in connection with the very quick revolution dynamo, so has the success of the marine turbine been brought about largely and the difficulties overcome by means of interesting, instructive and inspiring experiments and research conducted by Mr. Parsons with model screws. The story of the Turbinia and the ill-fated destroyers Viper and Cobra—the former having attained the almost unrealizable speed of 37 knots an hour—is now a matter of history, as are the later successes of the turbine steamers employed for passenger service by various railway companies and the Allan Steamship Co. We have before us a paper delivered some time ago by Mr. Parsons before one of our technical societies in which he had the temerity to suggest that Atlantic liners would one day be fitted with turbines of 30,000 I. H. P. We well remember that reception which this statement received in the hands of the many incredulous engineers. It is not so very long ago, yet now the new express Cunarders under construction have more than double the horsepower mentioned.

It must not be forgotten that what we might also call an auxiliary invention has been instrumental in bringing about the triumph of the steam turbine. A good vacuum is absolutely essential for economical steam consumption. By means of the vacuum augmenter a rise of 1½ in. was obtainable in the Manxman, which represented nearly 8 per cent addition of economy. The steam used by the jet in the augmenter was about 1½ per cent, thus leaving a gain of over 6 per cent.

It is news to many of us that there are at the present time twenty-five leading ship building and engineering firms in this country, as well as several foreign licensees, who have acquired the right to build Parsons turbines. The original company cannot cope with the demand.

There is one point with regard to the marine steam engine which will doubtless be settled at no distant date, and that is in connection with the economy to be gained either by wire-drawing or superheating the steam. It must be confessed that most marine men do not regard the superheater with any feelings of delight, and the practice, at any rate, in the royal navy, has been to generate steam at a comparatively high pressure and to let it be wire-drawn down so that it is in reality used as superheated steam at a lower pressure to that at which it is generated. We have seen no records of this being done with the marine turbine, and it is quite obvious that this method would entirely eliminate any danger due to very wet steam, or rather steam with water injuring the blades; it is a subject that has probably been well considered. We await with interest the results of official trials in connection with the marine turbine, because we feel that there is taking place a silent revolution in naval matters which will affect in no small degree a numerous class of engineers who go down to the sea in ships. It appears to be a far more simple charge to look after turbines than the huge reciprocating masses necessary to develop the same horsepower, and we fancy that we see here another example where there will be need for less highly-trained technical experts. The advantage, or disadvantage, of this state of affairs is, of course, quite an open question, but the marine engineer who does not read and note the signs of the times in connection with his work may one day have a rude awakening. The efficient engineer should certainly take the necessary steps to master the details and principles of the ubiquitous steam turbine. —*Engineering Times.*

Mr. Francis T. Bowles, president of the Fore River Ship Building Co., Quincy, Mass., with Attorney Samuel L. Powers, of Boston, representing thirteen ship building companies, appeared before the house committee on claims in Washington recently to explain a claim for $2,400,000 to reimburse the ship builders for losses of sixteen torpedo boat destroyers and twelve torpedo boats. The contracts for these vessels were let in 1898. The undertaking was experimental and unusual and unforeseen expenses made the cost exceed the contract prices considerably. The navy department is entirely familiar with the conditions and two secretaries of the navy have recommended the passage of the bill. Mr. Bowles' time was largely taken up in reviewing what had already been done, as the present committee on claims is unfamiliar with the subject. Others present at the hearing were George F. Lawley, of the George F. Lawley & Son Corporation, of South Boston, Mass., and Mr. John S. Hyde, representing the Bath Iron Works.

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INFORMATION ABOUT SHIPPING.

The Merchant Marine League of the United States with headquarters at Cleveland, sent the following bulletin, this week, to over 800 newspapers throughout the country:

There is opposition in certain quarters to the giving of subsidies to American ships in the foreign trade, in order that they may successfully compete with the foreign ships that now carry all but ten per cent of our entire imports and exports by sea. The United States is a highly protective country. Industries that are subject to foreign competition have been built up and fostered by the laying of heavy duties upon competing foreign imports. Those duties the equivalent of a subsidy, have enabled Americans, paying the much higher American rates of wages, to establish and profitably conduct a very great many businesses upon the land that they could not otherwise do. There are hundreds upon hundreds of different things made in this country today, that would not be made but for the high duty, averaging close to 50 per cent of their value, laid upon competing foreign imports.

WHY WE CANNOT PROTECT OUR SHIPPING BY THE TARIFF.

If it were possible to build up our shipping by laying a duty upon foreign ships entering our ports, doubtless that course would long ago have been pursued, and our shipping in the foreign trade would rank with our other great and protected industries. But three-quarters of a century ago we began to agree, and have successively agreed ever since with different nations, and written that agreement into treaties and conventions, which are higher than ordinary statutes, binding ourselves not to resort to that method in order to foster and develop our shipping. Now more than thirty such treaties, with nearly all of the great countries of the world, are in existence, and their abrogration, rearrangement, reratification and re-exchange are regarded as altogether too colossal a task for an administration to undertake, and so recourse is had, instead, to subsidies, the policy by which other countries build up and sustain their foreign-going shipping.

SUBSIDIES PAID BY OTHER NATIONS.

The commissioner of navigation states that upwards of $27,000,000 are paid annually by foreign governments in subsidies, subventions, bounties on construction and navigation, naval reserve retainers, and in other ways in order to build up and encourage their merchant shipping. Great Britain expends over $5,000,000 in this way; France about $8,000,000, Germany upwards of $3,000,000, Japan nearly $5,000,000, and other nations also spend large sums, notably Italy, Spain, Austria, Russia, Norway, Sweden, Belgium, Holland. Every one of these nations has cheaper labor in the ship yards in the building of ships, and on board their ships men receive far less than is paid to men on American ships, besides which the food is less in quantity and poorer in quality on foreign than it is on American ships. These are the effective advantages that foreigners possess over our ships in the carrying of our imports and exports. It is idle to suggest free trade as a remedy for this. Congress would not apply a free trade remedy, under any circumstances; it would be entirely contrary to our national policy; and, if such a policy were applied, it would be ineffective. A free trade policy cannot succeed in one American industry that is subject to foreign competition, while every other American industry that is subject to that competition is protected against it.

SOME OF THE SUBSIDIES PAID IN THE UNITED STATES.

Since the foundation of our government the sum of $470,000,000 has been expended for the improvement of our rivers and harbors, which is a subsidy to commerce, and a most beneficent one, too. The effect of it has been to reduce the cost of waterborne transportation, and, where it parallels rail transportation, to force a reduction in the rates by rail, to the advantage of producers and consumers alike. In many cases the benefits are entirely local, but it is the policy of the government, nevertheless, to improve the waterborne facilities for handling commerce, hence this vast outlay. Efforts are now being made by alert residents along the Mississippi and Ohio rivers to commit the government to an expenditure of from $65,000,000 to $70,000,000 for the further improvement of these great waterways, and doubtless they will succeed.

OUR SCHEME OF IRRIGATION.

Already some $30,000,000 has been expended by the government for the reclamation of arid lands in the west, for the benefit of settlers in that section, and the expenditure has been made in the way of building dams and digging ditches to impound the waters and distribute them with regularity throughout the year over these arid lands, in order to make them fertile. It is expected that many millions will be expended in this way during the coming year. This is nothing but a subsidy to the farmers in that section who settle upon, buy and develop those lands. It is beneficial to the whole country, in a way, as most subsidies that are paid by the government are, but the direct aid goes to the localities that are reclaimed, and to the people owning the lands.

MAIL SUBSIDIES TO OUR RAILROADS.

In addition to the free grant of over two hundred millions of dollars' worth of land to our great transcontinental railroads, lands now worth far in excess of a billion of dollars, we annually pay to our railroads no less a sum than $40,000,000 for the transportation of the mails; and the cost of the mails is far greater than the cost of handling any other kind of commodity transported by railroad. Yet the government gladly pays it, and the people believe that it is money spent in their interest. Yet it is a subsidy to the railroads just as much as the payments made to our steamship lines for carrying the mails are subsidies; there is no difference whatever between them, except that one is on the land and the other is on the sea. There is a great outcry against giving subsidies for mail carriage upon the ocean by newspapers that take it as a matter of fact that we should subsidize our railroads in this way.

TO EXTERMINATE THE BOLL WEEVIL.

An insect has been discovered that is committing great ravages in the cotton belt, in the destruction of cotton, while it is growing, called the boll weevil. Promptly southern farmers appealed to congress to make an appropriation for the extermination of this dangerous pest, and promptly the United States appropriated money for that purpose, to date over a half million of dollars having been expended in behalf of this one plant alone, for its protection against injury. And yet, many of these southern planters would wonder why the aid of the government should be given to our ships, although thinking it perfectly proper that is should be given to them, when their cotton crop is threatened.

HOW OUR NEWSPAPERS AND PERIODICALS ARE SUBSIDIZED.

Second class mail matter is carried in the United States for a cent a pound, a sum far less than the cost of distributing it. England charges about 8 cents a pound, and Germany between 5 and 6, and France about 5 cents a pound for distributing like matter, and, as we all know, the areas of those countries are infinitely smaller than ours, where the rate is 1 cent a pound. Postmaster-General Cortelyou in his last annual report, discussing this matter, states:

"According to estimates hereafter made and published, matter of the second class approximates in weight two-thirds of the bulk of all mail matter, yet produces only about 4 per cent of the postage revenue. The cost to the government of handling all mail matter is estimated to be between 5 and 8 cents a pound." "During the last fiscal year the total weight carried at 1 cent a pound and free was 663,107,128 pounds. If it cost the government as much as 5 cents a pound to handle this matter in the mails, it will be seen

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that the amount paid was $33,155,356.40. The actual revenue was $6,186,647."

This shows that our newspapers and periodicals enjoyed a subsidy at the hands of the government, during last year alone, of $26,968,709; that is, it cost the government $26,968,709 more to distribute their publications than they paid to the government for their distribution. Isn't that a subsidy? If it isn't a subsidy to the newspapers and periodicals, what is it? And yet, less than 20 per cent of that sum expended for the subsidizing of our shipping in the foreign trade is asked for, and objection is strenuously made by a number of publications that are themselves heavily subsidized by the government. There isn't much being said by the newspapers and periodicals that are opposing subsidies to our shipping against the subsidies they are enjoying in the distribution of their publications at the government's expense, at least to the extent of almost $27,000,000 annually. The government saves annually $2,500,000 a year in what it receives over what it pays out for ocean mail transportation. Paying that to American ships for carrying our ocean mails, and the remaining sum it is proposed to pay out under the pending shipping bill would not take from the treasury in the whole ten years of its operation nearly as much as the government pays out in one year over what it receives from publishers for the carriage and distribution of their newspapers and periodicals.

LOCAL SUBSIDIES OF ALL KINDS.

What community is not familiar with the subsidies paid by townships and villages to railroads, and gladly, in order to get them to come their way, so as to lessen the cost of transportation? How many boards of trade, chambers of commerce, and similar business men's oganizations are there in the United States that are willing to pay bonuses to industries, subsidies, in order to get them to locate in their localities? Free gifts of land, exemption from taxation for a period; in known cases a percentage of the weekly pay roll has been guaranteed, all subsidies, and all regarded as beneficial to the communities giving them. None of them is objected to. They are all regarded as helpful, as doubtless they are. The objection seems to be reserved for the subsidies to American ships. People who can tolerate the long list of subsidies above referred to, cannot tolerate the idea of subsidizing American ships in the foreign trade. It may well be asked, why? In many cases the answer would indicate that the objector didn't know why he objected; that he had unconsciously imbibed a prejudice against subsidies for American ships. This is because the foreign ship owners, whose vessels are now doing our foreign carrying, are doing their uttermost, all the time, to extend the feeling of opposition to subsidies to American ships. If the pending shipping bill is defeated, who will benefit? The foreign ship owners. Is it not likely that much of the opposition we see emanates from those who will benefit by the defeat of the bill? How many newspapers, for instance, that are furiously assailing the pending shipping bill are advocating any alternative measure for American shipping development? Subsidies? Why, there is nothing that is so common as the payment of subsidies.

MORAN BROS. CO.'S PLANT SOLD.

The ship building plant of the Moran Bros. Co., Seattle, Wash., has been purchased by eastern capitalists. The company issued the following statement concerning the transaction:

"Owing to failing health of the family and the necessity of rest from active business affairs, Moran Brothers have sold the controlling interests of the Moran Bros. Co. and have delivered over to a new management the business of the company as a going concern. They reserve for completion and delivery to the government by themselves the battleship Nebraska.

The president of the new company will be Mr. George H. Higbee, manager of the steamship and insurance department of the International Mercantile Marine Co., and one of the oldest employes of the American line. The general manager of the new company will be Mr. J. V. Patterson, naval architect for the International Mercantile Marine Co., who superintended the building of the American liners St. Paul and St. Louis, at Cramp's for the American line. Mr. Patterson has had complete charge of the construction and maintenance of the trans-Atlantic fleet of the American line for several years, and succeeded to a like position with the International Mercantile Marine Co. It is understood that the Griscoms, of Philadelphia will be closely associated with the new company.

OBITUARY.

Capt. Edward Henson, for many years a master on the lakes, died at his home at Port Clinton this week.

Capt. Webster Augustus, Inland Lloyds inspector at Kingston, Ont., died last week. He was born at Wellington and had sailed the lakes nearly all his life.

Capt. James Chase died at his home at Trenton, Mich., on Sunday last, at the age of eighty years. In earlier years he was well known as a lake master.

Mr. F. L. Dever died at El Paso, Texas, on March 3, 1906. Mr. Dever was United States assistant engineer at Duluth, Minn., and had local charge of dredging in Duluth-Superior harbor. He was in charge of the breakwater construction at Marquette, Mich., 1903-4, and resigned on account of ill health in 1905. He is survived by a widow and two children.

Andrew Reed, well known ship builder and former resident manager of Webb's Academy and Home for Ship Builders at New York, died at Massachusetts recently. Mr. Reed was born at Waldon, N. Y., Sept. 27, 1826. As a ship builder he built a number of famous vessels, including the Commodore, Vanderbilt and the Plymouth Rock, of the Fall River line. He became resident manager of Webb's Academy in 1893.

Wm Lydon, president, and T. C. Leutz, vice president, of the Great Lakes Dredge & Dock Co., of Chicago, recently visited the head of the lakes. This company recently took over the Duluth Dredge & Dock Co., and the Lake Superior Contracting & Dredging Co., of Duluth. The company owns thirty dredges and in addition to dredging does general contracting, including concrete work and dock construction. This company has a contract for cutting the proposed channel from the Mesabi docks to the channel on the east side of the upper harbor.

Shipmate ranges are made in eight sizes and eleven styles, by the Stamford Foundry Co., Stamford, Conn. So popular is this range aboard ship that the company recently instituted an inquiry among owners of large fleets as to how many of their vessels carried a Shipmate range. The replies show that in nearly every instance the whole fleet was equipped with them. The range is a most excellent one and is now being installed on a number of lake steamers.

The steamer Penobscot has been floated out of the dry dock of the Toledo Ship Building Co., after having been lengthened 96 ft. The work of fitting her out is now under way.

The steamer Theodore Roosevelt building for the Indiana Transportation Co., will be launched at the yard of the Toledo Ship Building Co., on March 31.

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JAPAN'S EAGERNESS FOR A MERCHANT MARINE.

A report of Special Agent Burrill, now in the far east, which has just been received by the Department of Commerce and Labor, gives some interesting data as to the methods of the Japanese to destroy competition and to obtain a monopoly of the carrying trade of the Pacific ocean. He says:

"In 1904, 450 steamers carrying the British flag, with 531,815 tons of cargo, entered the port of Amoy, as against one American vessel, carrying 644 tons. There were 123 German steamers, carrying 112,174 tons; six French carrying 3,034 tons; eighteen Dutch carrying 37,347 tons; sixty Norwegian carrying 50,232 tons; twenty-three Japanese carrying 19,516 tons, and forty-one Chinese carrying 42,160 tons. In Amoy, as in all other ports in China, the predominance of British shipping is startling, but the Japanese have recently signified their intention of exerting every effort to secure the coastwise trade of China. They openly declare, according to the shippers of the various ports, that they will carry freight cheaper than any other lines, even though the transaction results in a loss, in order eventually to break down competition. They now have boats in sufficient numbers to handle all the coastwise business, and as they are assisted by a subsidy from the Japanese government it seems reasonable to suppose that ultimately their purpose will be accomplished. Two years ago the Douglas line was operating at a profit eight coastwise steamers. The company has withdrawn all but three, and these, it is reported, are running at a loss because of Japanese competition."

The Japanese merchant marine is the most completely subsidized in the world. The government gives bounties of from eight to twelve dollars per ton for every ocean vessel built in Japan. When in operation it subsidizes them for every hundred miles. And this with a teeming population just recovering from an exhausting war and the cheapest of labor. As a result, Japanese shipping increased from 150,000 tons in 1890 to 830,000 in 1904. It has now afloat in foreign commerce more steamships than the United States. Incidentally—do the two facts appear related?—its foreign commerce has expanded from $117,000,000 in 1894 to $342,000,000 in 1904. These facts are of absorbing interest in connection with the situation in the Orient. Few doubt that Japan will some day proclaim a sort of a "Monroe Doctrine" for China and that China will accept it. Japan has already driven Russia back and gracefully absorbed Corea, which it is now, anaconda-like, digesting. Now, the Japanese are bidding for what few ocean-going vessels America has on the Pacific coast. It is not denied that it has options on our line to Australia and no secret is made by the owners that if the subsidy bill fails they will sell.

It is generally believed the Japanese have options on the Pacific Mail steamers; in any event they have bid for them also. The owners of the line from Puget Sound to Hawaii now declare they will be compelled to withdraw their ships if the bill is beaten. That will leave the Pacific coast denuded of American vessels, and in case of trouble in China or the Philippines, where will the navy get its colliers and the army its transports? This is what is now giving the officials of these departments concern. Those who scout the suggestion of an American merchant marine, take the ground that if English, French, German and Japanese subsidized ships will carry our commerce cheaper than Americans can, let them do so and pocket the money. But what the war and navy departments want to know is whether in case of trouble in the far east, the Germans, Japanese, French and English will be kind enough to transport our troops and supplies?

To an unprejudiced observer it would appear that perhaps the interests of these nations might conflict with ours and their ship owners might find that they had other pressing business to attend to at such a time. Such possibilities are not expected to weigh much with the rabid friends of foreign steamship owners who are apparently determined to keep our commerce in the hands of our competitors, but they may be seriously considered by those who have the interests of their country at heart and who do not go on the theory that in time of war, even with our tremendous resources, we can sow a bunch of steel-plates at night and reap an auxiliary navy of fully manned and equipped vessels, the following day.

TRADE NOTES.

The National Electric Co., Milwaukee, Wis., has just issued a bulletin devoted to their type "N L" direct current motors and generators.

The Caldwell improved float valve, a description and illustration of which was published in a recent issue of the REVIEW, is manufactured by the W. E. Caldwell Co., Louisville, Ky.

The Goldschmidt Thermit Co., 43 Exchange Place, New York, has issued a special bulletin containing instructions for welding wrought iron and steel pipes by means of thermit. The method described in the present bulletin is an improvement upon the old method, in that cast iron instead of sheet iron molds are used for the work, which has considerably simplified the operation.

Vesselmen speak highly of Wilford's water-proof cloth which is being extensively used on the great lakes as a hatch covering. It is the toughest and most serviceable cloth that they have ever met with and is absolutely water-proof. A great deal of it is now being used in fitting out for the coming season. Mr. E. A. Bunker, P. O. Box 1579, New York, handles the cloth in this country.

Observer Wiesner of the United States weather bureau at Houghton, Mich, expects to receive within a few days the instruments to be installed at a supplementary station at the Portage lake life saving station at the canal. The instruments will be set up in time to be of service with the opening of navigation. They consist of an anemometer and a self-registering record of wind velocity. The anemometer's principal feature is a set of revolving cups which may be seen above any weather station. It records the velocity of the wind. In this case the anemometer will be set up above the tower which is used at the life saving station for lookout purposes, and the registering instrument will be placed in the office of Capt. McCormick, in command of the station. The necessity of an instrument to measure the velocity of the wind at the canal is found in the fact that the hills which parallel the shores of Portage lake break the wind from Houghton, where is located the weather bureau station. The velocity often shown there is 50 per cent less than on the open lake, or at the canal, where the wind's full force is felt. A report to a vessel captain of the velocity of twenty miles at Houghton might not give the true conditions on Lake Superior, and might be misleading, in fact, often has been in the past. Under the new arrangement the captains can receive accurate information as to the wind's velocity on Lake Superior from Capt. McCormick.

The Lebanon Chain Works, Lebanon, Pa., has been engaged for several months past on a large contract of chain to be furnished to the third lighthouse district at Tompkinsville, Staten Island.

The Kelly-Spear Co., Bath, Me., will build a lighter for Rowe Bros., of Portland, Me., to be 110 ft. long, 32 ft. wide and 9 ft. deep.

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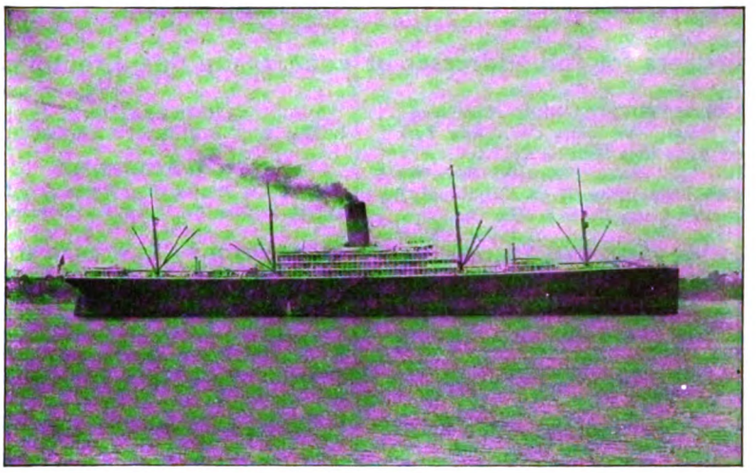

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See accompanying index of Advertisers for full addresses of concerns in this directory.

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Great Lakes Engineering Works.....Detroit.
Mietz, Aug. .....New York.

AIR PORTS, DEAD LIGHTS, ETC.
Marine Mfg. & Supply Co.....New York.

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Fore River Ship & Engine Co..Quincy, Mass.
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Dearing Water Tube Boiler Co.....Detroit.
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East End Boiler Works.....Detroit.
Fletcher, W. A. & Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Works....
.....Oswego, N. Y.
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Mosher Water Tube Boiler Co....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
New York Shipbuilding Co.....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co....
.....Duluth, Minn.
Quintard Iron Works Co.....New York.
Roberts Safety Water Tube Boiler Co....
.....New York.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.

BOILER RIVETS.
Bourne-Fuller Co.....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co..Cuyahoga Falls, O.

BRASS AND BRONZE CASTINGS.
Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co..Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co.....Cincinnati.

BRIDGES, BUILDERS OF.
Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.
Brown Hoisting & Conveying Machine Co.
..... Cleveland.

BULKHEAD DOORS, WATERTIGHT.
"Long Arm" System Co.....Cleveland.

CABIN AND CABINET FINISHING WOODS.
Martin-Barriss Co.....Cleveland.

CANVAS SPECIALTIES.
Baker & Co., H. H.....Buffalo.
Bunker, E. A. .....New York.
Upson-Walton Co.....Cleveland.
Republic Belting & Supply Co.....Cleveland.

CAPSTANS.
American Ship Windlass Co..Providence, R. I.
Dake Engine Co.....Grand Haven, Mich.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CEMENT, IRON FOR REPAIRING LEAKS.
Smooth-On Mfg. Co.....Jersey City, N. J.

CHAIN CONVEYORS, HOISTS.
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.
General Electric Co.....Schenectady, N. Y.

CHAIN HOISTS.
Boston & Lockport Block Co....Boston, Mass.
Republic Belting & Supply Co.....Cleveland, O.

CHARTS.
Penton Publishing Co.....Cleveland.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

COAL AND ORE HANDLING MACHINERY.
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.

COMPASSES.
Ritchie, E. S. & Sons.....Brookline, Mass.

CONDENSERS.
Great Lakes Engineering Works.....Detroit.
Thropp & Sons Co., John E...Trenton, N. J.

CONTRACTORS FOR PUBLIC WORKS.
Breymann & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Great Lakes Dredge & Dock Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Hubbell Co., H. W.....Saginaw, Mich
Lake Superior Contracting & Dredging Co.,
..... Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H..Milwaukee.
Sullivan, M.....Detroit.

CORDAGE.
Baker & Co., H. H.....Buffalo.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.
Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.

CRANES, TRAVELING.
Brown Hoisting Machinery Co.....Cleveland.

DIVING APPARATUS.
Morse, A. J. & Son.....Boston.
Schrader's Son, Inc., A..... New York.

DREDGING CONTRACTORS.
Breymann & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Great Lakes Dredge & Dock Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Hubbell Co., H. W.....Saginaw, Mich
Lake Superior Contracting & Dredging Co.
..... Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H..Milwaukee.
Sullivan, M.....Detroit.

DREDGING MACHINERY.
Quintard Iron Works Co.....New York.

DRY DOCKS.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co....Superior, Wis.
Tietjen & Lang Dry Dock Co.....Hoboken, N. J

DREDGE BUILDERS.
Manitowoc Dry Dock Co.....Manitowoc, Wis.

DYNAMOS.
General Electric Co.....Schenectady, N. Y
Mietz, Aug.....New York.
Thropp & Sons, John E.....Trenton, N. J.

ELECTRIC HOISTS AND CRANES.
General Electric Co.....Schenectady, N. Y.

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WANTED and FOR SALE Department.

PROPOSALS.

U. S. Engineer Office, Detroit, Mich., March 10, 1906 Sealed proposals for dredging Rouge River, Mich., will be received here until 3:00 P. M., April 10, 1906, and then publicly opened. Information furnished on application. CHARLES KELLER, Capt., Engrs.

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FOR SALE.

FOR SALE.

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CARKIN, STICKNEY & CRAM,
DETROIT, MICH.

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Address W. J. GREENWOOD,
Pt. Colborne, Ont.,
or J. B. Hall, Agt, Buffalo, N. Y.

For Sale.

Steamer Columbia, length 115 ft., beam 21 ft. Steamer Crescent, length 80 ft., beam 16 ft. For further information apply to C. A. Webb, Traverse City, Mich.

A Bargain.

Steamer E. F. Gould, length 137 ft., width 28 ft, depth 8 ft. 5 in, tonnage 261 tons. Boiler, engine and hull in good condition. First-class, complete sand pumping outfit now installed on boat, will sell with boat if so desired. Apply

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Wanted

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Buyers' Directory of the Marine Trade.—*Continued.*

ELECTRIC LIGHT AND POWER PLANTS.
General Electric Co.....Schenectady, N. Y.
Mietz, Aug. .....New York.
Thropp & Sons, John E.....Trenton, N. J

ENGINE BUILDERS, MARINE.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Shipbuilding Co....Quincy, Mass.
Great Lakes Engineering Works.Detroit, Mich.
Hall Bros. .....Philadelphia.
Lockwood Mfg. Co.....East Boston, Mass.
Maryland Steel Co.....Sparrows Point, Md.
Mietz, Aug.....New York.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
New York Shipbuilding Co....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co...
..... Duluth, Mich.
Quintard Iron Works Co.....New York.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.
Cory, Chas. & Son.....New York.
Marine Mfg. Supply Co.....New York.

ENGINEERING SPECIALTIES AND SUPPLIES.
Lunkenheimer Co. .....Cincinnati.
Northwestern Steam Boiler & Mfg. Co...
..... Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.
Hynd, Alexander .....Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph.....Duluth, Minn.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Roelker, H. B. .....New York.
Wood, W. J. .....Chicago.

FEED WATER PURIFIERS AND HEATERS.
Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.
Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.
General Electric Co.....Schenectady, N. Y.

FORGES.
Sutton Co., C. E.....Toledo, O.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.
Cleveland City Forge & Iron Co...Cleveland.
Fore River Shipbuilding Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.
Fix's, S. Sons.....Cleveland.

FUELING COMPANIES AND COAL DEALERS.
Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co.....Detroit.

FURNACES FOR BOILERS.
Continental Iron Works.....New York.

GAS BUOYS.
Safety Car Heating & Lighting Co..New York.

GAS AND GASOLINE ENGINES.
Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.
Lunkenheimer Co. .....Cincinnati.

GAUGES, WATER.
Lunkenheimer Co. .....Cincinnati, O.

GENERATING SETS.
General Electric Co.....Schenectady, N. Y.

GRAPHITE.
Dixon Crucible Co., Joseph..Jersey City, N. J

GREASE EXTRACTORS.
Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.

HAMMERS, STEAM.
Chase Machine Co.....Cleveland.

HEATING APPARATUS.
Sutton Co., C. E.....Toledo, O.

HOISTS FOR CARGO, ETC.
American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co..... Grand Haven, Mich.
General Electric Co.....New York.
Georgian Bay Engineering Works.....
.....Midland, Ont.
Hyde Windlass Co.....Bath, Me.
Marine Iron Co.....Bay City.
Mietz, Aug. .....New York.

HOLLOW SHAFTINGS, IRON OR STEEL.
Falls Hollow Staybolt Co...Cuyahoga Falls, O.

HOLLOW STAYBOLT IRON.
Falls Hollow Staybolt Co...Cuyahoga Falls, O.

HYDRAULIC DREDGES.
Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.
Watson-Stillman Co., The.....New York.

ICE MACHINERY.
Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

INJECTORS.
American Injector Co.....Detroit.
Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., E. J.....Chicago.
Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F..New York & Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

IRON CASTINGS.
Sutton Co., C. E.....Toledo, O.

IRON ORE AND PIG IRON.
Bourne-Fuller Co.....Cleveland, O.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.
Truscott Boat Mfg. Co.....St. Joseph, Mich.

LIFE PRESERVERS, LIFE BOATS, BUOYS.
Armstrong, Cork Co.....Pittsburg.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D.....New York.

LIGHTS, SIDE AND SIGNAL.
Russell & Watson .....Buffalo.

LOGS.
Nicholson Ship Log Co.....Cleveland.
Walker & Sons, Thomas....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.
Dixon Crucible Co., Joseph..Jersey City, N. J.

LUBRICATORS.
Lunkenheimer Co. .....Cincinnati

LUMBER.
Martin-Barriss Co.....Cleveland.

MACHINISTS.
Chase Machine Co.....Cleveland.
Hickler Bros.....Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.

MACHINE TOOLS (WOOD WORKING).
Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.
Hickler Bros.....Sault Ste. Marie, Mich.

MARINE RAILWAYS, BUILDERS OF.
Crandall & Son, H. I.....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.
Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.
American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.

METALLIC PACKING.
Katzenstein, L. & Co.....New York.
The National Metallic Packing Co....Oberlin, O

MOTORS, GENERATORS—ELECTRIC
General Electric Co.....Schenectady, N. Y.

NAUTICAL INSTRUMENTS.
Benjamin Farnum How.....Boston
Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.
Hynd, Alexander .....Cleveland.
Kidd, Joseph .....Duluth, Minn.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Wood, W. J. .....Chicago.

OAKUM.
Stratford, Oakum Co.....Jersey City, N. J.

OIL ENGINES.
Mietz, Aug. .....New York.

OILS AND LUBRICANTS.
Dixon Crucible Co., Joseph..Jersey City, N. J.
Standard Oil Co.....Cleveland.

PACKING.
Jenkins Bros. .....New York.
Katzenstein, L. & Co.....New York.
The National Metallic Packing Co....Oberlin, O.
Republic Belting & Supply Co.....Cleveland, O.

PAINTS.
Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co. .....Cleveland.

PATTERN SHOP MACHINERY.
Atlantic Works, Inc.....Philadelphia.

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Henry C. Frick	Geo. H. Russel	Sylvania
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Frank J. Hecker	Socapa	Peter White

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Buyers' Directory of the Marine Trade.—*Continued.*

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Great Lakes Dredge & Dock Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Hubbell Co., H. W.....Saginaw, Mich.
Lake Superior Contracting & Dredging Co. .....Duluth, Minn.
Parker Bros. Co., Ltd.....Detroit.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H..Milwaukee.
Sullivan, M.....Detroit

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland, O.
Macbeth Iron Co.....Cleveland.
Reading Iron Co.....Reading, Pa.

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

PRESSURE REGULATORS.

Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co.....Bath, Me.
Lockwood Mfg. Co. .....East Boston, Mass.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co..... .....Newport News, Va.
Roelker, H. B.....New York.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp & Sons Co., J. E.....Trenton, N. J.
Trout, H. G.....Buffalo.

PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.

PUMPS FOR VARIOUS PURPOSES.

Great Lakes Engineering Works.....Detroit.
Marine Iron Works.....Chicago.
Kingsford Foundry & Machine Works..... .....Oswego, N. Y.

PUNCHES AND SHEARS.

Sutton Co., C. E.....Toledo, O.

RANGES.

Stamford Foundry Co.....Stamford, Conn.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register.....Cleveland.

RIVETS, STEEL FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland, O.

RUBBER SUPPLIES.

Republic Belting & Supply Co.....Cleveland, O.

SAFETY VALVES.

Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.....Schenectady, N. Y.

SHAFTING, HOLLOW.

Falls Hollow Staybolt Co..Cuyahoga Falls, O.

SHEARS.

See Punches, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co..... .....Newport News, Va.
New York Shipbuilding Co....Camden, N. J.
Rosch's Ship Yard.....Chester, Pa.
Shipowner's Dry Dock Co.....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
Marine Mfg. & Supply Co.....New York.
Upson-Walton Co.....Cleveland.

SHIP DESIGNERS.

Kidd, Joseph .....Duluth.
Steel, Nacey & Hynd.....Cleveland.
Wood, W. J.....Chicago.

SHIP LANTERNS AND LAMPS.

Russell & Watson.....Buffalo.

SHIP TIMBER.

Martin-Barriss Co.....Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLT IRON OR STEEL BARS, HOLLOW OR SOLID.

Falls Hollow Staybolt Co..Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Holmes, Samuel .....New York.
Lester, S. S.....Quebec, Can.
McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line .....New York.
Anchor Line .....Buffalo.
Boston Steamship Co.....Boston.
Cleveland & Buffalo Transit Co.....Cleveland.
International Mercantile Marine Co..... .....Philadelphia.
Mallory Line .....New York.
Merchants' Montreal Line.....Montreal.
New York & Cuba Mail S. S. Co...New York.
Red Star Line.....New York.
United Fruit Co.....Boston

STEEL CASTINGS.

Otis Steel Co.....Cleveland.
Sutton Co., C. E.....Toledo, O.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.
Moulton Steering Engine Co.....New York.
Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
Schrader's Son, Inc., A..... ....New York.

SURVEYORS, MARINE.

Gaskin, Edward .....Buffalo.
Hynd, Alexander .....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Nacey, James .....Cleveland.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
Lunkenheimer Co.....Cincinnati, O.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia

TOWING MACHINES.

American Ship Windlass Co..Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co..... .....Kingston, Ont.
Great Lakes Towing Co.....Cleveland.

TRUCKS.

Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Ross Valve Co.....Troy, N. Y.

VALVES FOR WATER AND GAS.

Lunkenheimer Co.....Cincinnati.
Republic Belting & Supply Co.....Cleveland, O.
Ross Valve Co.....Troy, N. Y.

VARNISHES.

Detroit Varnish Co.....Detroit.
Detroit White Lead Works.....Detroit.
Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sutton Co., C. E.....Toledo, O.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., E. J.....Chicago.
Hall, John B.....Buffalo.
Helm & Co., D. T.....Duluth.
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel .....New York.
Hutchinson & Co.....Cleveland.
Lester, S. S. .....Quebec, Can.
McCarthy, T. R.....Montreal.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

WATER GAUGES.

Lunkenheimer Co.....Cincinnati, O.

WATERTIGHT BULKHEAD DOORS.

"Long Arm" System Co.....Cleveland.

WHISTLES, STEAM.

Lunkenheimer Co..... Cincinnati.

WILFORD'S WATERPROOF CLOTH.

Bunker, E. A. .....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

WINDLASSES.

American Ship Windlass Co..Providence, R. I.
American Ship Building Co.....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

WINCHES.

American Ship Windlass Co..Providence, R. I.
Georgian Bay Engineering Works..... .....Midland, Ont.
Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co..... .....Kingston, Ont.
Great Lakes Towing Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.

YACHT AND BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Truscott Boat Mfg. Co.....St. Joseph, Mich.

YAWLS.

Drein, Thos. & Son.....Wilmington, Del.

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